.5313
.A512 m

AMERICAN METEOROLOGICAL SOCIETY

Illinois U Library

meteorological

abstracts and bibliography

Bibliography on the Climatology of Northwest Africa, p. 37

METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

Editor and Technical Supervisor: MALCOLM RIGBY

Corresponding Editor: DR. C. E. P. BROOKS

EDITORIAL STAFF

ISADORE L. DORDICK, *Analyst*
WILHELM NUPEN, *Analyst*
MARY L. RICE, *Assistant Editor-Bibliographer*
HARRIS P. KRAMER, *Bibliographer-Analyst*
MOLLIE P. KRAMER, *Bibliographer*
GEZA T. THURONYI, *Bibliographer*
WINIFRED SCHRAITLE, *Cataloguer*
DOROTHY M. GROPP, *Cataloguer*
KATHERINE MARTINOFF, *Technical Editor*

*EDITORIAL OFFICE: Washington, D. C. P.O. ADDRESS: Box 1736, Washington 13, D. C. Telephone: REpublic 6278.

ADMINISTRATIVE OFFICE: American Meteorological Society, Office of Executive Secretary, 3 Joy Street, Boston 8, Mass.

* Address all business communications, orders and inquiries to the Executive Secretary, Mr. Kenneth C. Spengler, 3 Joy Street, Boston 8, Mass. Exchanges and reprints may be sent direct to P. O. Box 1736, Washington 13, D. C.

METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY is a monthly publication devoted to:

A. Current Abstracts in English on important meteorological literature in every language.

B. Bibliographic references to other items of interest to the profession.

C. Selective, annotated bibliographies on subjects of immediate and special interest to meteorologists.

SUBSCRIPTION RATE: $6.00 per year to members and non members. Single and back issues $2.00. Back volumes, $10 per volume.

This publication has been made possible through support and sponsorship extended by the Geophysics Research Division of the Air Force Cambridge Research Center under Contract No. A. F. 19 (122) 82. It is published for technical information only and does not represent the recommendations or conclusions of the sponsoring agency.

METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

QC
851
A62
V.3
1952
MAIN

MALCOLM RIGBY, Editor

Vol. 3 JANUARY 1952 No. 1

SPECIAL FEATURE IN THIS ISSUE

A Selective Annotated Bibliography on the Climatology of Northwest Africa

(For complete table of contents see back cover)

U. OF I.
LIBRARY

Published monthly at Prince and Lemon Streets, Lancaster, Pa., by the AMERICAN METEOROLOGICAL SOCIETY, 3 Joy Street, Boston 8, Mass.

Printed and issued by: Lancaster Press, Inc.

Thus in our 1950 and 1951 issues the number of and percentage of abstracts in each of the 10 leading languages was as follows:

	1950		1951	
	No.	%	No.	%
Total	3856	100.	4495	100.
English	2356	61.0	2474	54.4
German	978	25.5	1108	24.4
French	188	4.6	254	5.6
Russian	149	3.9	211	4.6
Italian	40	1.0	124	2.7
Spanish	28	0.7	80	1.8
Japanese	12	0.3	74	1.6
Dutch	39	1.0	43	0.9
Polish	4	0.1	33	0.7
Hungarian	11	0.3	26	0.6

Other languages represented in 1951 were Chinese (14 items), Swedish (13), Turkish (9), Portuguese (7), Catalonian (5), Finnish (4), Czech (3), Norwegian (3), Hindi (3), Croatian (1), Danish (1), Ukranian (1), Hebrew (1) and in 1950 Romanian (1) and Serbian (2).

These figures are not necessarily a representative sample of the material *actually published* in 1950 and 1951, respectively, as they include a considerable number of older works. However, a comparison of the above data with that for *only* the material issued in 1950 and 1951 shows that essentially these same relationships held. Thus out of 1769 items published in 1950 there were: English 1097, German 401, French 79, Russian 68, Japanese 62, Italian 49, Spanish 25, Dutch 19 and Hungarian 10, and in 1951 out of 468 there were: English 350, German 114, French 15, Russian 5, Spanish 8, Dutch 8. Because of the slowness in acquiring Russian, Japanese, Polish, Czech, Hungarian and some material in other rare languages, relationships between these languages may change somewhat as time goes on. Probably Russian will exceed French, and Japanese will exceed Spanish and Italian in quantity and the percentages for English and German will be reduced accordingly by an order of 2 or 3%. *Quality* is an entirely different matter. Not even a rough approximation can be made at present as to the *qualitative* relationships of the work produced in the various languages or by the various countries. Rough statistics for the quantity of material produced in each *country* are being compiled and will be summarized in a later issue.

FOREWORD

Meteorological Abstracts and Bibliography is a monthly publication whose purpose is to bring to the attention of meteorologists current literature in their field and in related fields and to provide bibliographic information on various subjects, as interest demands.

Part I contains from 175 to 300 abstracts of current periodical literature and monographs in the fields of meteorology, hydrology, oceanography, etc. These abstracts are arranged according to the Universal Decimal Classification.

Part II of each issue comprises a special annotated bibliography of from 50 to 250 important references on a special subject without respect to recency of material. No attempt is made to prepare exhaustive bibliographies; instead, the aim is to include a representative cross section of the various aspects of a subject. Preference is given to recent material, comprehensive works, material from obscure sources, and items with good bibliographies.

Bibliographies previously published were:

No.	Mo.	Vol. I, 1950	Vol. II, 1951
1.	Jan.	**Atmospheric Pollution**	**Extended Forecasting**
2.	Feb.	**Aerobiology**	**Long Range Forecasting**
3.	March	**Cloud Physics and "Rain Making"**	**Soil Temperature**
4.	April	**Hail**	**Constants, Units, Tables and Diagrams**
5.	May	**Tornadoes**	**Climate of the Near East**
6.	June	**Volcanic Dust**	**Climate of the Middle East**
7.	July	**Climatic Changes**	**Special Winds**
8.	Aug.	**Thunderstorms**	**Radar Storm Detection**
9.	Sept.	**Icing**	**Condensation Trails**
10.	Oct.	**Acoustical Propagation**	**Climate of Northeast Africa**
11.	Nov.	**Evaporation**	**Mountain Meteorology**

Forthcoming bibliographies will be:

1. **Climatology of Northwest Africa,** Vol. III, No. 1, Jan. 1952
2. **Carbon Dioxide,** Vol. III, No. 2, Feb. 1952
3. **Climates of Argentina, Paraguay and Uruguay,** Vol. III, No. 3, March 1952
4. **Dew,** Vol. III, No. 4, April 1952

Other bibliographies in preparation are:

Actinometers
Climate and Cancer
Climate of Central Africa
Climate of Southeast Asia
Climate of the East Indies
Frost and Frost Forecasting
Machine Methods in Meteorology
Microwave Transmission
Objective Forecasting
Oceanographic Meteorology
Ozone
Stratus Forecasting
Turbulence
Urban Climatology
Visibility

Part III contains a listing of the contents of those journals which are primarily meteorological. These are published in the earliest issue where space permits.

Part IV is made up of author, subject and geographical indexes. In the June and December issues cumulative indexes are published.

* *Note:* Because of the large number of entries in the annual index, and the inevitable delay in attempting to insure accuracy, the December issue (Index) will not be ready for distribution for some time after the January 1952 issue is published.

out interruption to date. (*See item* 2.8–4 in Aug. 1951 *Meteorological Abstracts* for abstract of Pt. III.) *Subject Headings:* **1. History of meteorology 2. Poland.**—*M.R.*

3.1–6 551.5(09)

Seilkopf, Heinrich, **Die meteorologische Tätigkeit der Deutschen Seewarte für Seeschifffahrt und Seefischerei 1875–1945.** [The meteorological activity of the Deutsche Seewarte for marine shipping and fishing from 1875–1945.] *Wetterlotse*, Hamburg, No. 9:1–4, March **1951.** 4 charts. **DWB**—A brief historical account of the activities of the Deutsche Seewarte. A reproduction of the first German synoptic map, prepared by W. KÖPPEN, is presented. *Subject Headings:* **1. Marine meteorology 2. History of meteorology 3. Hamburg. Deutsche Seewarte 4. Germany.**—*I.L.D.*

3.1–7 551.5(09)

Strüder, Paul, **Die Meteorologie des Descartes.** [Descartes' meteorology.] *Meteorologische Rundschau*, 4(5–6):110, May–June **1951. MH-BH**—Brief account of DESCARTES' writings on various branches. *Subject Headings:* **1. Descartes, René 2. History of meteorology.**—*C.E.P.B.*

3.1–8 551.5:06

Lynch, Alberto M., **El servicio meteorológico en el Perú.** [The meteorological service in Peru.] *Revista Meteorológica*, 10(36–37):31–36, Jan.–April **1951. MH-BH**—Resumé of the history of the meteorological service since 1905. Its existence under various organizations is mentioned and successive chiefs are named. The author outlines the organization of the service today and includes a brief discussion of each of these sections: forecasting, general circulation and telecommunications. Outlines plans for the future, especially the establishment of an Instituto Nacional de Meteorología e Hidrología which will provide an expansion of the Service. *Subject Headings:* **1. Meteorological services 2. Peru. Servicio Meteorológico.**—*M.R.*

3.1–9 551.5:06

McTaggart-Cowan, P. D., **Weather and the Canadian Weather Service,** *Canadian Banker*, Winter, **1951.** p. 2–13. 9 photos. Reprint available. **DWB**—A description of the Canadian Weather Service and of its various activities and services to the public. *Subject Headings:* **1. Meteorological services 2. Canada. Meteorological Division.**

3.1–10 551.5:37

Florida State University, **Meteorology and climatology at Florida State University.** Florida State University, Academic Year **1951–1952.** 13 p. **DWB**—The members of the faculty are listed, research and library facilities enumerated, courses in meteorology and climatology described, requirements for B.S. and M.S. degrees and other information are given. Among the unusual courses presented are: microclimatology, climate through the ages, hydrometeorology and physical oceanography. The department is under the direction of WERNER A. BAUM. *Subject Headings:* **1. Teaching of meteorology 2. Teaching of oceanography 3. Florida State University.**—*M.R.*

3.1–11 551.5:523.43

Dollfus, Audouin, **Détermination de la pression atmosphérique sur la planète Mars.** [Determination of atmospheric pressure on Mars.] *Académie des Sciences, Paris, Comptes Rendus*, 232(11):1066–1068, March 12, **1951.** 10 refs., equations. **DWB**—The atmospheric pressure on Mars has been studied by polarization measurements of the light from Mars. The methods are: 1) difference between polarization at the center and at the edge of the disc; 2) the difference between these two areas for green and orange; 3) comparison of polarization curves for different areas of the surface for green and red. It is estimated that the atmosphere on Mars has a pressure of 83 millibars at the ground surface. *Subject Headings:* **1. Planetary atmospheres 2. Atmospheric pressure 3. Mars.**—*I.L.D.*

3.1–12 551.5:523.4

Pecker, Charlotte, **Sur le raccord d'une zone adiabatique et d'une zone radiative dans l'atmosphère des étoiles.** [The combination of an adiabatic and a radiational zone in stellar atmospheres.] *Académie des Sciences, Paris, Comptes Rendus*, 232(11):1605–1066, March 12, **1951.** 10 equations. **DWB**—The derivation of a mathematical expression combining a given adiabat with a surface radiational zone of particular optical thickness is presented. It is based upon the hydrostatic equation and the equation of radiational transfer. *Subject Headings:* **1. Planetary atmospheres 2. Atmospheric structure.**—*I.L.D.*

3.1–13 551.5:523.7

Peyturaux, Roger, **Sur la température de brillance du centre du disque solaire entre 6700 et 23000Å déduite des observations récentes.** [The brightness temperatures at the center of the solar disc between 6700 and 23,000 Å determined from recent observations.] *Académie des Sciences, Paris, Comptes Rendus*, 232(11):1069, March 12, **1951.** 3 refs. **DWB**—The authors found that the maximum temperature in the solar photosphere is located at 16,500 Å, the position of minimum absorption of H^- according to CHANDRASEKHAR. The minimum temperature was found at between 8000 and 1200 Å, the maximum absorption of H^-. The ionization potential of H^- is therefore 0.75eV, the value determined by CHANDRASEKHAR. *Subject Heading:* **1. Solar temperature.**—*I.L.D.*

3.1–14 551.5:523.8

Pecker, Charlotte, **Sur l'équilibre de la zone convective des atmosphères des étoiles.** [On the equilibrium of the convective zone of stellar atmospheres.] *Académie des Sciences, Paris, Comptes Rendus*, 232(10):932–934, March 5, **1951.** **DWB**—The modification of radiational equilibrium under the conditions of a convective zone in adiabatic equilibrium in stellar atmospheres is discussed. Equations for the transfer of energy under this condition are presented. *Subject Heading:* **1. Stellar atmospheres.**—*I.L.D.*

3.1–15 551.5:55:060(47)

Soloveĭchik, R. E. and Gandin, L. S., **Itogovaia sessiia Uchenogo Soveta Glavnoĭ Geofizicheskoĭ Observatorii po rabotam 1946 g.** [Final session of the Learned Council of the Central Geophysical Observatory for 1946.] *Meteorologiia i Gidrologiia*, No. 3:78–80, **1947.** **DWB**—The meetings of the session consisted of general and sectional meetings on separate groups of meteorological problems. Ten papers were presented at the general meetings. At the sectional meetings, 3 groups of problems were discussed: 1) experiments and problems of meteorology; 2) climatology and forecasts; 3) physics and dynamics of the atmosphere. *Subject Headings:* **1. Meteorological conferences 2. U.S.S.R. I. Leningrad. Glavnaia Geofizicheskaia Observatoriia.**—*C.K.*

3.1–16 551.5:629.13

Fraser, D. O., **Optimum flight paths.** *Institute of Navigation, Journal*, 4(2):178–200, April **1951.** 13 figs., 13 refs. **DWB**—The history of attempts at calculating optimum flight paths is outlined and the various methods which have been used are explained mathematically and illustrated graphically. Procedures now in use on the North Atlantic air route, including planning charts, templates for each section of the air route, nomograms for calculating average wind along track, for single heading calculations or pressure pattern flights are shown. Use of flight planning from actual winds also discussed and illustrated. From one month's synoptic charts of 500 mb. contours, the average time saved by using single heading procedures over the great circle route was 1 hour (15%) and the saving using minimum time procedures was 2½ hours (12%). Maximum time saved by this method was 11 hours (33%). *Subject Headings:* **1. Pressure pattern flying 2. Aeronautical meteorology 3. Optimum flight paths.**—*M.R.*

3.1–17 551.5:629.13

Harrison, Henry T., **Some meteorological problems indicated for jet transport operation at 40,000 ft.** *Aeronautical Engineering Review*, 10(4):52–61, April **1951.** 13 figs., 6 refs. Reprint available. **DWB, DLC**—Temperature, wind and turbulence are the three most

important factors affecting flight at 40,000 ft. Statistics are presented to show the magnitude of these factors and the success which present-day forecasting methods achieve for jet transport operation at these levels. Wind is the least accurate element forecast; temperature forecasts would be adequate. *Subject Headings:* **1. Meteorological elements 2. Upper air flights 3. Jets 4. Aeronautical meteorology.**—*M.R.*

METEOROLOGICAL OBSERVATIONS AND INSTRUMENTS

METHODS OF OBSERVATION

3.1–18 551.501:551.515.8

Font Tullot, Inocencio, **Primeros resultados de los sondeos termodinámicos de la troposfera en Baleares.** [Preliminary results of thermodynamic soundings of the troposphere in the Balearies.] *Spain, Servicio Meteorológico Nacional, Publicación, Ser. A*, No. 14, **1943.** 36 p. 18 figs., 2 tables. **DWB**—Airplane meteorograph observations (Apobs) made at Majorca during 1938–1940 are described and illustrations of equipment and records given. An analysis is made of these soundings (70 out of 78 reaching 4000 m. elevation) on the basis of air masses, inversions, etc. Examples are given of thetagrams for many cases which illustrate different air masses or inversion types. A table gives air mass frequency (after SCHINZE). *Subject Headings:* **1. Apobs 2. Air masses 3. Inversions 4. Majorca, Balearic Islands. I. Spain. Servicio Meteorológico Nacional.**—*M.R.*

3.1–19 551.501(02)

List, Robert J. (*comp.*), **Smithsonian meteorological tables.** 6th rev. ed. *Smithsonian Institution, Publication* 4014, **1951.** 527 p. **DLC, DWB**—The first edition of these famous tables was issued in 1893 (*see item* 2D–35 in April 1951 *Meteorological Abstracts*), and revised editions in 1896, 1897, 1907, 1918 and 1931. The tables remained essentially the same through all these years. A reprint was made in 1939, but with no additions or revisions. The great expansion of the scope and interest in meteorology during the war (1939–45) led to the decision to completely revise the work from cover to cover. A committee of experts from the U. S. Weather Bureau and the Smithsonian Institution (H. WEXLER, R. D. FLETCHER, J. R. FULKS, L. P. HARRISON, W. C. JACOBS, and others, with the assistance of ROSS GUNN, I. F. HAND, J. B. LEIGHLY, R. B. MONTGOMERY, S. FRITZ, J. A. DUERKSEN and L. B. ALDRICH) aided in preparation of text and tables and succeeded in making this revision possible after 3 years of intensive work. Some of the new tables are: conversion of temperature lapse rates from metric to English units and vice-versa, millibars to inches, millibars to millimeters, nautical miles to kilometers and vice versa, miles per hour to knots, kilometers per hour to knots, meters per second to knots an vice versa; geostrophic wind, constant pressure surface for 100 geopotential meter and 200 geopotential foot contours; gradient wind, coriolis parameter and latitude variation, ROSSBY's long wave formula; thickness of strata between standard isobaric surfaces, and mean vertical temperature; standard atmosphere (NACA and ICAN) and related altimetry tables, and a score of thermodynamic tables. A new section (VIII) on "Miscellaneous Properties of Air and Airborne Particles" is full of tables of chemical composition and acoustical properties of the atmosphere, viscosity, thermal conductivity, terminal velocity of fall of water drops, size and character of aerosols, and evaporation of falling drops. Section IX gives properties of water substance and soils (ice, snow, sea water, rocks, etc.). Section X consists of numerous nomograms, useful radiation, absorption, albedo and visibility tables, potential temperature, pseudoadiabatic lapse rates (water and ice stage), precipitable water, lifting condensation level, enthalpy and entropy residual of moist air, etc. Hygrometric tables are somewhat elaborated, including dew point conversion charts for centigrade and Fahrenheit temperatures and for ice and water, tables of equilibrium supersaturation over solution droplets at 233°, 243°, 253°, 263° and 273° K. The last section gives a dozen or more geodetic and astronomical tables, including several new tables on scale variations on standard map projections, distribution of water and land in various latitudes and elaborate charts showing solar altitude and azimuth for every 5° or 10° latitude 0–90°N. The principal deletion has been the section which gave a list of meteorological stations of the world, and the International Meteorological Symbols. However, the detailed tables in the section on radiation

in themselves, constitute a valuable contribution to routine calculations in meteorology well worth the cost of the publication. *Subject Headings:* **1. Tables 2. Constants 3. Barometer reduction 4. Hygrometry. I. Smithsonian meteorological tables. II. Smithsonian Miscellaneous Collections, Vol. 114.**—*M.R.*

3.1–20 551.501.1:06(02)

Spain. Servicio Meteorológico Nacional, **Cursillo-instrucciones de meteorología general.** [Course of instructions in general meteorology.] *Spain, Servicio Meteorológico Nacional, Publicación, Ser. B,* No. 3, **1944.** 59 p. figs., photos. **DWB**—The various terms and symbols used on synoptic charts and in recording observations are defined in a systematic manner. The first chapter describes the organization and functions of the Spanish National Meteorological Service, next the methods of observation, then synoptic symbols and codes and then in successive chapters clouds and international classification (low, medium and high), fog, haze, rain, snow, hail, thunderstorms, ice, aurora, storms, optical phenomena and finally, state of the ground or soil. Profusely illustrated. *Subject Headings:* **1. Observers manuals 2. Definitions 3. Synoptic codes 4. Meteorological services 5. Spain. Servicio Meteorológico Nacional.** —*M.R.*

3.1–21 551.501.1:551.524.36

Spain. Servicio Meteorológico Nacional, **Instrucciones para la observación de las temperaturas extremas.** [Instructions for the observation of extreme temperatures.] *Spain, Servicio Meteorológico Nacional, Publicación, Ser. C,* No. 11, **1943.** 15 p. 4 figs., tables. **DWB**—Instructions for recording maximum and minimum temperature at third order stations. Examples of records are included and the instruments and shelter used in climatological work in Spain, shown. *Subject Headings:* **1. Temperature observation 2. Observers manuals.**—*M.R.*

3.1–22 551.501.1:551.57

Spain. Servicio Meteorológico Nacional, **Instrucciones para los observadores de la estaciones pluviométricas.** [Instructions for observers at meteorological stations.] *Spain, Servicio Meteorológico Nacional, Publicación, Ser. C,* No. 10, **1943.** 31 p. 3 figs., tables. **DWB**—Brief instructions for the observation of rainfall, hydrometeors, clouds, wind, fog, state of the sea, thunderstorms, etc. at third order stations in Spain. The instructions are very clearly given. *Subject Headings:* **1. Observers manuals 2. Rainfall observation.**—*M.R.*

3.1–23 551.501.4(02)

*Spain. Servicio Meteorológico Nacional, **Tablas meteorológicas.** [Meteorological tables.] *Spain, Servicio Meteorológico Nacional, Publicación, Ser. C,* No. 14, **1945.** 11+p. 14 tables. **DWB**—Detailed tables for conversion, reduction and computation of heights of pressure surfaces and other dynamic values used in upper air analysis and research. *Subject Headings:* **1. Computation tables 2. Reduction tables 3. Manuals.**—*M.R.*

3.1–24 551.501.4:551.54(02)

Spain. Servicio Meteorológico Nacional, **Tablas barométricas.** [Barometric tables.] *Spain, Servicio Meteorológico Nacional, Publicación, Ser. C,* No. 16, **1947.** 20 p. chiefly tables. **DWB**—Tables for correction, conversion and reduction of barometer readings, as employed by the Meteorological Service of Spain. *Subject Headings:* **1. Reduction tables 2. Barometer corrections 3. Observers manuals.**

3.1–25 551.501.6:551.524.3:551.577.3

Hlaváč, Václav, **Nový způsob soucásného grafického znázorňování časového průběhu odchylek teploty a srážed.** [A new method for simultaneous graphic presentation of variations in temperature and precipitation.] *Meteorologické Zprávy,* 4(3–4):65–69, **1950.** graph. In Czech. **DWB**—An ingenious but rather elaborate "climagram" is devised, discussed and illustrated. Instead of use for average data, however, this method is to be used for actual data. *Subject Headings:* **1. Climagrams 2. Graphical presentation.**—*M.R.*

3.1–26 551.501.7:551.547.1

Canada. Meteorological Division, **Revised overlay for the tephigram to aid in determining the thickness of the layer between the standard pressure surfaces.** *Canada, Meteorological Div., Cir.* 1840, Sept. 26, 1950. **DWB**—The overlay (on thin film) is graduated by means of virtual mean temperature. It is placed on the tephigram with a straight line over it, dividing required pressure interval into two halves, and the thickness is read off directly. *Subject Heading:* **1. Tephigrams.**—*C.E.P.B.*

3.1–27 551.501.7(02)

U. S. Air Weather Service, **Radiosonde and rawinsonde code.** *U. S. Air Weather Service, Manual* 105–20, Jan. 1951. 56 p. **DWB**—Detailed coding and decoding instructions for reporting upper air temperatures, humidities, heights and winds, the 1949 radiosonde and rawinsonde code (I.M.O.). Units and terms are defined precisely. *Subject Headings:* **1. Synoptic reports 2. Radiosonde codes 3. Code manuals.**—*M.R.*

3.1–28 551.501.7(02)

*U. S. Air Weather Service, **Dropsonde observations.** *U. S. Air Weather Service, Manual* 105–23, Jan. 1951. 27 p. figs., charts. **DWB**—Detailed instructions for inspection, conditioning, release, and calculation of records from dropsondes, including description of forms and description of equipment and purpose of observations. Terms are defined and computation charts included. *Subject Headings:* **1. Dropsondes 2. Observers manuals 3. Airplane weather reconnaissance.**—*M.R.*

3.1–29 551.501.9:551.510.535(98)(57)

Ostrekin, M. E., **Novye magnitnye i ionosfernye stantsii v Sovetskoĭ Arktike.** [New magnetic and ionosphere observation stations in the Soviet Arctic.] *Problemy Arktiki*, No. 2: 120–121, 1944. **DGS**—Description of observation stations in Tiksi Bay which started their work in 1944. *Subject Headings:* **1. Ionospheric stations 2. Soviet Arctic.**

3.1–30 551.501.9:551.594.6

van de Hulst, H. C., **Radiosterrewacht Sydney.** [Sydney Radio Observatory.] *Hemel en Dampkring*, 49(5):81–90, 1951. 7 figs., table. **DLC**—A detailed, illustrated survey of the work done at Sydney Observatory, with special emphasis on recording solar bursts, observations of the solar corona, the temperature of the moon, etc. which can be studied by means of radio propagation or reception equipment. Other observatories in various parts of the world such as the ones at Manchester, England or Leiden, Holland, and workers such as REBER in the United States, COVINGTON in Canada, LAFFINEUR in France are mentioned. However, the Sydney Observatory is still foremost in the world in radio-astronomy investigations. *Subject Headings:* **1. Microwave research 2. Radio observatories 3. Australia. Commonwealth Observatory 4. Sydney, Australia.**—*M.R.*

OBSERVATIONAL DATA

(*See also items:* 3.1–96, 3.1–113, 3.1–134, 3.1–154)

3.1–31 551.506:551.510.535

*U. S. National Bureau of Standards, **Ionospheric data.** *U. S. National Bureau of Standards, Central Radio Propagation Laboratory, Report* CRPL-F81, May 1951. 67 p. 84 figs., 69 tables. **DBS, MH-BH, DWB**—Sources of ionospheric data in various parts of the world, which are regularly sent to the Central Radio Propagation Laboratory at Washington, D. C. and are coordinated with data obtained at Washington, are given. Terminology and symbols are defined. Hourly data for Washington, D. C. for April 1951 includes all manner of ionospheric characteristics. Mean values of these characteristics for each day are included for all available parts of the earth. Ionospheric storminess at Washington, sunspot numbers at Zurich, coronal observations in Colorado and New Mexico and much other data are included. *Subject Headings:* **1. Ionospheric data 2. Washington, D. C.**—*M.R.*

3.1-32 551.506.1:06(43)

*Germany. Deutscher Wetterdienst in der US-Zone, **Deutsches meteorologisches Jahrbuch, 1940. Teil II: Monats- und Jahresergebnisse.** [German meteorological yearbook, 1940. Pt. 2: monthly and yearly results.] Bad Kissingen, **1951.** 142 p. tables, fold. map. **DWB**—The annual report contains 0700, 1400, 2100 hours mean monthly temperature, relative humidity, wind data etc. for second and third order stations; frost and snow cover data; five day means of barometric pressure, temperature, sunshine duration and precipitation; monthly and annual duration of sunshine; daily march of solar radiation; mean monthly 0700, 1400 and 2100 hours soil temperatures at depths of 0.1 m., 0.2 m., 0.5 m. and 1.0 m. A map showing the network of stations is included. *Subject Headings:* **1. Meteorological services 2. Climatic data 3. Annual reports 4. Germany.**—*I.L.D.*

3.1-33 551.506.1(595)

*Malaya. Meteorological Service, **Summary of observations, 1946.** Singapore, **1950.** 67 p. tables. **DWB**—The characteristic features of the climate of Malaya are summarized. The climatological summary for each station includes data on temperature, relative humidity, precipitation and wind directions, and wind velocity. Also autographic hourly records of temperature, relative humidity and rainfall are presented. Climatological data for North Borneo and Sarawak are included. *Subject Headings:* **1. Observational data 2. North Borneo 3. Malaya.**—*I.L.D.*

3.1-34 551.506.1(058)(45)

*Milan. Osservatorio di Fisica Terrestre, **Annuario. Vol. 7, 1950.** Como, **1951.** 30 p. graphs, tables. **DWB**—Daily, monthly and annual pressure, temperature, vapor pressure, relative humidity, precipitation, wind, cloudiness, sunshine and hydrometeors are given for Como Observatory for 1950, and a summary of most of these elements for 1934–1950 appended. Data in tabular and graphic form including a discussion of peculiarities are given for pressure, temperature, humidity and precipitation for 1950 compared with the "normal." Hourly averages and frequencies of amounts or intensities given in tables. Wind frequency data compared with average for 1940–50 surface wind roses, seismologic data are also included. No actinometric data were obtained in 1950. *Subject Headings:* **1. Climatic data 2. Yearbooks 3. Como, Italy.**—*M.R.*

3.1-35 551.506.5(04)(61)

Rogers, Peter, **A glimpse of summer.** *Weather*, 6(6):180–184, June **1951.** 2 photos. **DWB**—Account of rainstorms on a drive from Algiers to Biskra. *Subject Headings:* **1. Rainstorms 2. Algeria.**

3.1-36 551.506.7(595)

*John, I. G., **The properties of the upper air over Singapore.** *Malaya, Meteorological Service, Memoirs*, No. 4, **1950.** 35 p. 22 plates, 33 tables, 12 refs. **DWB**—Tables and tephigrams give mean monthly pressure, temperature and moisture conditions up to 250 mb. based on an analysis of 45 airplane ascents made between Dec. 1946 and July 1948 at Kuala Lumpur Airport and other bases at Singapore. The effect of diurnal heating, air masses and air mass analysis in the Malay region and subsidence in the southwest monsoon are discussed in separate chapters and accompanied by useful tables and charts for calculating air mass properties or analyzing charts. *Subject Headings:* **1. Upper air data 2. Air masses 3. Singapore, Malaya.**—*M.R.*

3.1-37 551.506.7(595)

Malaya. Meteorological Service, **Summary of observations of winds. (Surface and upper.) 1939, 1940, 1941.** Singapore, Government Printing Office, **1949. DWB**—Pilot balloon observations were begun in Malaya in Sept. 1932 (Singapore and Kuala Lumpur) and in subsequent years additional stations were added to the network (Penang, Labuan and Kuala Pahang). Tail observations were made up to 10,000 ft. to check rate of ascent. Data from 1934 on were published for 1500, 3000, 6000 and 10,000 ft. and given in the form of frequency

of winds from 8 directions in 5 velocity groups for 2 observations a day. *Subject Headings:* **1. Upper air wind data 2. Malaya.**—*M.R.*

3.1–38 551.507.321:629.13

The General Mills Aeronautical Research Laboratories. *American Meteorological Society, Bulletin*, 32(3):111–112, March **1951. MH-BH**—Development of enormous "skyhook" balloons by General Mills is described and the balloon illustrated. These balloons have carried loads of 432 lbs. to >77,000 ft. and 150 lbs. to >105,000 ft. *Subject Headings:* **1. Constant level balloons I. General Mills Aeronautical Research Laboratories.**—*M.R.*

3.1–39 551.507.321.2

Edwardes, H. N., **High altitude meteorological balloon techniques.** *Australia, Commonwealth Scientific and Industrial Research Organization, Div. of Radiophysics, RPR* 107. Nov. **1950.** 20 p. 16 figs., 3 tables, 6 refs., 9 equations. **DWB**—This is a monograph dealing with characteristics of various rubber balloons used for upper air studies, the various factors affecting balloon ceilings such as effect of height on balloon ceiling, insolation, differential pressure and balloon life, theoretical and experimental analysis of ascensional rate and balloon ceilings and the double-balloon technique. In addition, the properties of nonexpanding balloons made of plastic, namely: ceiling balloons, open balloons and controlled altitude balloons are discussed. *Subject Heading:* **1. Balloon research.**—*I.L.D.*

INSTRUMENTS

(*See also items:* 3.1–117, 3.1–135, 3.1–140, 3.1–147)

3.1–40 551.508.53

Teuchner, Zdeněk, **Montáž anemografu.** [Mounting for an anemograph.] *Meteorologické Zprávy*, 4(3–4):92–93, **1950.** 4 figs. In Czech. **DWB**—A method of mounting an anemometer and wind vane, and the connection with the recording and indicating devices in the laboratory, is described briefly and illustrated with excellent photographs. *Subject Headings:* **1. Anemographs 2. Wind instruments.**—*M.R.*

3.1–41 551.508.53/4

Kozumplík, Stanislav, **Universální anemograf a anemometrické dvojče.** [The universal anemograph and the tele-anemometer.] *Meteorologické Zprávy*, 4(3–4):93–98, **1950.** 5 figs. In Czech. **DWB**—A complicated universal anemometer and anemograph, and the circuits for distant recording with minimum loss in the transmission line are discussed at great length and illustrated with detailed drawings of equipment and circuits and reproductions of records. Both total or integrated wind from Robinson type anemometers, and instantaneous gustiness records from pressure tube anemometers can be recorded simultaneously by this scheme. *Subject Headings:* **1. Anemometers 2. Anemographs 3. Distant recording equipment.**—*M.R.*

3.1–42 551.508.71

Fowler, J. R., **M.S.C. type IV motor psychrometer.** *Canada, Meteorological Div., Cir.* 1908, March 1, **1951.** 5 p. 2 diagrs. **MH-BH**—Air from inside screen is drawn by AC-DC motor past dry and wet bulbs in large duct at 20 m.p.h. Working diagram given for installation. *Subject Heading:* **1. Psychrometers.**—*C.E.P.B.*

3.1–43 551.508.822(02)

Oliva Flores, Eugenio, **Radiosondas.** [Radiosondes.] *Spain, Servicio Meteorológico Nacional, Publicación, Ser. B*, No. 2, **1943.** 22 p. 14 figs., 5 refs. **DWB**—A description and illustration of each of 9 kinds of radiosondes used at that time in various countries. The ASKANIA, BUREAU, CURTISS and ASTIN, GALCIT, Blue Hill, LANG, U. S. Weather Bureau and MOLTCHANOFF (Molchanov) instruments are shown by photographs of the working parts (assembled). The OLLAND, LANG, German (Marina Alemana) and VÄISÄLÄ circuits are shown diagrammatically. Mention is made of the DUCKERT-TELEFUNKEN and KÄLZER-GRAW systems. *Subject Headings:* **1. Radiosondes 2. Instrument manuals. I. Spain. Servicio Meteorológico Nacional.**—*M.R.*

3.1–44 551.508.824

Air-launched automatic weather station. *Instruments*, Pittsburgh, 24(9):1053, Sept. **1951.** photo. **DWB**—Describes the "Grasshopper," an automatic weather station, which transmits weather data by radio. It can be parachuted from aircraft onto inaccessible territory, has a land range of more than 100 miles and can transmit weather reports at 3-hour intervals for more than 15 days. May also be used as a radio marker-beacon. *Subject Heading:* **1. Automatic weather stations.**—*M.L.R.*

3.1–45 551.508.91

Rodebush, W. H., **Filtration of aerosols.** (In: U. S. Office of Scientific Research and Development, National Defense Committee, **Handbook on aerosols.** U. S. Govt. Printing Office, **1950.** p. 117-122. 4 figs., 4 refs., equation.) **DWB**—A discussion of the action of open-mesh filters (glass wool, rock wool, fibers). Electrostatic filters are briefly mentioned. *Subject Heading:* **1. Aerosol filters.**—*C.E.P.B.*

3.1–46 551.508.91

Sinclair, David, **Measurement of particle size and size distribution.** (In: U. S. Office of Scientific Research and Development, National Defense Committee, **Handbook on aerosols.** U. S. Govt. Printing Office, **1950.** p. 97–116. 15 figs., 2 tables, 16 refs., equation.) **DWB**—Methods of measurement described: light and electron microscope, sampling methods by centrifugal separation, thermal precipitator (favored for particles less than 1μ), gravity settling, mass concentration by weighing or optical means. A differential settler is described. Other methods involve color and polarization and the scope-o-meter for average size by light transmission of various wave-lengths (instrument described). *Subject Heading:* **1. Aerosol measurement.**—*C.E.P.B.*

3.1–47 551.508.94

Seper, Hans and Sauberer, Franz, **Neue Geräte zur Messung und Registrierung der luftelektrischen Feldstärke.** [New instruments for measuring and recording atmospheric electric field strength.] *Wetter und Leben*, 3(5–7):143–148, June **1951.** 4 figs., 6 refs. **MH-BH**—Describes and illustrates the construction of a new portable quadrant electrometer, recording on a drum. It can record the changes of potential gradient during passage of a front, and the change from place to place in the town. A new fool-proof "static multiple voltmeter," very small and light, and an autographic potential recorder, driven by a hair spring which gives immediately visible dot records, are also described. *Subject Headings:* **1. Electrometers 2. Atmospheric electricity instruments 3. Recording equipment.**—*C.E.P.B.*

SYNOPTIC ANALYSIS AND FORECASTING

(*See also items:* 3.1–104, 3.1–114, 3.1–115)

3.1–48 551.509.1(02)

U. S. Air Weather Service, **Caw-C code.** 2nd ed. *U. S. Air Weather Service, Manual* 105–6, Feb. **1951.** 49 p. **DWB**—Detailed code for meteorological reports from Air Weather Service weather reconnaissance aircraft, based on I.M.O. CAW-C code (1949). *Subject Headings:* **1. Airplane weather reconnaissance 2. Code manuals.**—*M.R.*

3.1–49 551.509.1(02)

U. S. Air Weather Service, **Sferics code.** *U. S. Air Weather Service, Manual* 105–29, March **1951.** 10 p. **DWB**—A manual giving instructions and code form to be used by U. S. Air Weather Service units in coding and decoding sferics data for transmission or use in synoptic analysis. The W.M.O. (I.M.O.) has no approved sferics code at this time. Great Britain has one similar to this U. S. code. France and colonies and Switzerland use a different code. Details of both the British and the French (ATMOS) codes are given in a supplementary section of this manual. *Subject Headings:* **1. Synoptic codes 2. Sferics codes 3. Code manuals.**—*M.R.*

3.1–50 551.509.1(02)

U. S. Air Weather Service, **Terminal forecast (TFAWS) code.** *U. S. Air Weather Service, Manual* 105–25, Feb. **1951.** 7 p. 5 tables. **DWB**—A brief manual for coding and decoding

U. S. Air Weather Service terminal forecasts of cloud or ceiling height, visibility and weather conditions for definite periods of time. *Subject Headings:* **1. Synoptic codes 2. Terminal forecasts 3. Code manuals.**—*M.R.*

3.1–51 551.509.1(02)

U. S. Air Weather Service, **Utilization of artillery rawinsonde data.** *U. S. Air Weather Service, Manual* 105–17, Jan. **1951. DWB**—Instruction for coding and decoding artillery rawinsonde data in the form of the present international TEMP SHIP code, FM 36. The artillery data must first be plotted and re-calculated in order to conform to the international ship code for upper air temperatures, pressures, humidities and winds. *Subject Headings:* **1. Synoptic codes 2. Artillery rawinsonde data 3. Code manuals**—*M.R.*

3.1–52 551.509.3

Bungaard, Robert C., **Forecasting by statistical and synoptic extrapolation. I. The method of statistical extrapolation.** *International Union of Geodesy and Geophysics, Association of Meteorology, Transactions, Oslo 1948*, 2:59–60, **1950.** Mimeographed. **DWB**—A technique of weather forecasting is described in general terms. For each weather station a prediction equation expressing the future value of the 500 mb. height for intervals of 24 hours is developed. The present contour pattern, the history of its development for a given number of days and the historical development of systems of heights, lows and troughs in surrounding areas are considered. *Subject Headings:* **1. Weather forecasting 2. Statistical forecasting.**—*I.L.D.*

3.1–53 551.509.3:016

†California Institute of Technology, **Evaluation of forecast aids. Part I. World-wide weather studies. Part II.** Contract AF W28–099 ac–430, Preliminary Progress Report, May 28, **1948.** 18 p. 2 figs., refs. *Ibid.*, Final Report, Aug. 15, **1948.** 99 p. 40 figs., 10 tables, biblio. p. 63–99. **DWB**—The initial work involved the preparation of a card file and bibliography, usually from a preliminary literature survey, and the compilation of results of answers to a questionnaire received from 900 forecasters, to help in evaluation of forecast aids for 12 hour movements of highs, lows and wave crests. The aids tested for Sept.–Nov. 1947 were: 1) the steering method, 2) extrapolation method, 3) Petterssen's method, 4) mean trajectory method. For steering, the 700 and 500 mb. levels were found to be more indicative than the 850 mb. or 300 mb. levels. Results are given in detail and a list of 500 references divided into 5 categories is included. *Subject Headings:* **1. Forecast aids 2. Short range forecasting 3. Objective forecasting 4. Bibliographies. I. Contract AF W28–099 ac 430.**—*M.R.*

3.1–54 551.509.3

*South Africa. Meteorological Research Bureau, **Statistical weather forecasting.** Pretoria, **1947.** 58 p. tables, refs., equations. Mimeographed. **DWB**—A rough, but comprehensive treatment of the method of short or long range forecasting by means of statistical methods—that is, by using maximum correlation coefficients. Methods of treating data, selecting parameters or places for correlation, smoothing, reduction of standard error, integrated autocorrelations, integration along a single space coordinate, orthogonal analysis, examples of use of method and estimation of success of application to forecasting for South Africa and the United States, presented. The last chapter takes up an application of statistical methods to forecasting rate and direction of travel of atmospheric disturbances across South Africa. *Subject Headings:* **1. Statistical forecasting 2. South Africa.**—*M.R.*

3.1–55 551.509.3(02)

U. S. Air Weather Service, **Preparation of weather maps and charts.** *U. S. Air Weather Service, Manual* 105–22, June **1950.** 44 p. 4 figs., tables. **DWB**—A detailed manual for use in plotting data and analyses on surface synoptic charts, constant pressure charts, wind aloft charts and surface or constant pressure prognostic charts. Terms are defined, symbols given and plotting models included. *Subject Headings:* **1. Synoptic analysis 2. Code manuals.**—*M.R.*

3.1–56 551.509.311:551.515.2

Mintz, Yale, **A rule for forecasting the eccentricity and direction of motion of tropical cyclones.** *American Meteorological Society, Bulletin*, 28(3):121–125, March **1947.** 4 figs., 5 refs. **MH-BH**—Starting with rule that cyclones move in direction of strongest winds, author relates asymmetry to general deep temperature field. The mechanism of upper air steering is discussed and illustrated by cyclone of Oct. 7–19, 1946. In regions with horizontal temperature gradients, cyclones are eccentric on the warm air side and move along mean free air isotherms with warmer air to the right. *Subject Headings:* **1. Tropical cyclone 2. Weather forecasting.**—*C.E.P.B.*

3.1–57 551.509.317

Brandejs, Stanislav, **Některé pomůcky aerologické praxe.** [Some aids for aerological practices.] *Meteorologické Zprávy*, 4(3–4):62–65, **1950.** 4 figs., 37 equations. In Czech. **DWB**—Theoretical derivation of a nomogram for calculating relative topography, etc. between 1000, 850, 700 and 500 mb. surfaces and other isallobaric movements. *Subject Headings:* **1. Relative topography 2. Upper air analysis 3. Nomograms.** *M.R.*

3.1–58 551.509.317(02)

U. S. Air Weather Service, **High-level isotach analysis.** *U. S. Air Weather Service, Manual* 105–26, Feb. **1951.** 10+p. 9 figs., refs. **DWB**—When data for winds at high levels (30,000 ft. or higher) is wanting, analysts and forecasters have been accustomed to using wind values derived from pressure fields as constructed on upper level contour charts. Now that more actual upper wind data is available, it is maintained that better agreement with fact can be obtained by isotach analysis—that is, by constructing charts on the basis of actual reported winds as much as is possible. Features such as double jet streams show up on these charts. This manual gives the procedure, theory and examples of charts constructed by this technique. In each instance the 30,000 ft. isotach analysis is compared with the 300 mb. contour analysis for the same time. *Subject Headings:* **1. Synoptic analysis 2. Isotach analysis 3. Upper air wind charts 4. Manuals.**—*M.R.*

3.1–59 551.509.34

Canada. Meteorological Division, **A local forecast study for Goose Airport, Labrador.** *Canada, Meteorological Div., Local Forecast Study* No. 1, *Cir.* 1900, Feb. 16, **1951.** 14+p. figs., tables. **MH-BH**—A combined study by 9 forecasters with local experience. Includes description and map of site, account of winds and turbulence, detailed account of weather associated with various air masses and fronts and with lows to south and east, and conditions for fog. Tables are given for ceiling/visibility/wind and for temperature. *Subject Headings:* **1. Local forecasting 2. Goose Airport, Labrador.**—*C.E.P.B.*

3.1–60 551.509.34:551.515.8:551.551.576(754)

Hoover, Robert A., **Forecasting the weather—Forecasting the duration of low clouds following cold front passages at Elkins, West Virginia.** *Weatherwise*, 4(3):62–63, June **1951.** 4 figs. **MH-BH**—The orientation and number of 3 millibar isobars between Elkins and the center of the ridge of high pressure back of the cold front, in its passage over Elkins, provides the best index of the duration of cloudiness. The validity of this method is discussed. The average run of estimate for January, February and March 1945 and 1951 was eight hours. *Subject Headings:* **1. Local forecasting 2. Cold fronts 3. Clouds 4. Elkins, West Virginia.**—*I.L.D.*

3.1–61 551.509.34:551.577.1

U. S. Weather Bureau, **Physical basis for production of rain in Hawaii.** U. S. Weather Bureau [Aug. **1950**] 13 p. 7 figs., 11 refs. **DWB**—Based on experience of Weather Bureau forecasters in Hawaii, several conclusions are drawn as to the factors which are necessary for rainfall in that area. First, it is stated that ice crystal nuclei are *not* necessary, but that thickness of the cloud is the most important factor in determining rate of rainfall. However, the heaviest rainfall occurs from clouds whose tops are above the 0° isotherm. Heaviest rains

occur with occluded cyclones or cold lows. These rains account for half the total rainfall but only a small percentage of the occurrences. Most of them are accounted for by horizontal convergence in the surface layer of easterlies as evidenced by troughs in the upper troposphere, or by eastward movement of surface highs north of Hawaii. Orographic effects are important in combination with other factors. *Subject Headings:* **1. Rainfall forecasting 2. Trade inversion 3. Cloud physics 4. Hawaiian Islands.**—*M.R.*

CLOUD SEEDING AND ARTIFICIAL PRECIPITATION

(*See also item:* 3.1–136)

3.1–62 551.509.67

Anderson, Clinton P., **The weather control bill.** *Weatherwise*, 4(1):17–19, Feb. **1951.** photo. **MH-BH**—The constitutional basis of the bill, the purpose and provisions and a section by section analysis of the bill are presented. *Subject Headings:* **1. Weather control 2. Artificial precipitation.**—*I.L.D.*

3.1–63 550.509.67

Dessens, Henri, **Recherches sur la pluie artificielle à l'Observatoire du Puy-de-Dôme.** [Research on artificial rain at the Puy-de-Dôme Observatory.] *Annales de Géophysique*, 6(4):331–344, Oct.–Dec. **1950.** 6 figs., table, 22 refs. French and English summaries p. 331. **DBS**—A report of the results of 33 attempts to produce artificial rain by the use of a spray of a saturated sodium chloride solution, carbon dioxide, snow and silver iodide. The conditions in the clouds and the properties of the saturated sodium chloride droplets, the weight of which is 10^6 greater than that of the cloud droplets, leading to successful production of artificial rain, are discussed. Photographs of a cloud seeding experiment with the use of salt solution are given. *Subject Headings:* **1. Artificial precipitation 2. Cloud seeding 3. Puy-de-Dôme, France.**—*I.L.D.*

3.1–64 551.509.67(969)

Leopold, Luna B. and Mordy, Wendell A., **1948–1949 trials of the Schaefer-Langmuir cloud-seeding technique in Hawaii.** *Tellus*, 3(1):44–52, Feb. **1951.** 3 tables, 7 refs. **MH-BH**—During 1948 and 1949 dry ice cloud seeding tests were made on six days over Lanai and on nine days over Molokai Island. The results are tabulated with great detail as to meteorological conditions, time, amount of CO_2 dropped, height and thickness of clouds, height and temperature of release and of cloud tops and rainfall (if any) as recorded at a fairly dense network of stations. During days when seeding occurred there was a higher frequency of heavy rains than on non-seeding days, and the heaviest rains seemed to be associated with sub-freezing cloud tops. (*See* previous report C–150 in March 1950 *Meteorological Abstracts.*) *Subject Headings:* **1. Cloud seeding 2. Hawaiian Islands.**—*M.R.*

3.1–65 551.509.67

Pawsey, J. L., **Australian work on seeding of cumulus clouds with "dry ice."** *International Union of Geodesy and Geophysics, Association of Meteorology, Transactions, Oslo 1948*, 2:50–52, **1950.** Mimeographed. **DWB**—An experiment on the production of artificial rain from cumulus clouds seeded with dry ice is described. Seeding was followed by the development of cumulonimbus clouds and by considerable rainfall. Approximately simultaneously rainfall was recorded only from cumulus clouds associated with a 180 mile distant front. *Subject Headings:* **1. Artificial precipitation 2. Cloud seeding.**—*I.L.D.*

3.1–66 551.509.67

Reichelderfer, F. W., **Can we change the weather?** *U. S. News and World Report*, March 3, **1950.** p. 19–20. 3 figs. **DWB**—A series of questions about rain making, cloud seeding, storm control and climatic changes are answered by Dr. Reichelderfer, the Chief of the U. S. Weather Bureau. The conclusion is that experiments at cloud seeding, while at present not conclusive, may lead to results in prevention of thunderstorms or other incidental benefits, even though not resulting in economically important increase in rainfall. We do

not know enough about climatic cycles and changes to predict more than a month ahead with any skill. The work of the Weather Bureau in cloud physics experiments and forecasting is outlined. *Subject Headings:* **1. Weather control 2. Cloud seeding 3. Climatic changes 4. U. S. Weather Bureau.**—*M.R.*

STRUCTURE AND PHYSICS OF THE ATMOSPHERE

STRUCTURE OF THE ATMOSPHERE

(*See also items:* 3.1–29, 3.1–31, 3.1–138, 3.1–164, 3.1–171, 3.1–183)

3.1–67 551.510.42:551.575.5

Horning, Forrest E., **Artificially induced fog engulfs Denver Airport.** *Weatherwise*, 4(3):67, June **1951. MH-BH**—The fog was produced by fumes containing hydrogen chloride gas which is highly hygroscopic. The synoptic conditions prevailing at time fog was formed are described. *Subject Headings:* **1. Atmospheric pollution 2. Artificial fog 3. Denver Airport, Colorado.**—*I.L.D.*

3.1–68 551.510.42:551.575

Robertson, George W., **Winter fog at the Edmonton Airport.** *Canada, Meteorological Div., Local Forecast Study* No. 2, *Cir.* 1898, Feb. 16, **1951.** 13 p. 11 figs., 5 tables. **MH-BH**—Edmonton Airport is 2½ miles NNW of City Center. Water from burning natural gas causes fog in winter below 0°F. Frequency tables show increased fog with low temperatures, winds from S-SSW of 2–5 m.p.h. Diurnal variation affected also by gas consumption, and visibility can be forecast quantitatively from known water production from gas. Fog is also caused by exhaust condensation from automobiles and aircraft. With growth of city fog problem is becoming more acute. *Subject Headings:* **1. Atmospheric pollution 2. Artificial fog 3. Edmonton Airport, Alberta.**—*C.E.P.B.*

3.1–69 551.510.5(02)

Barbier, Daniel and Chalonge, Daniel, **De la stratosphère à l'ionosphère.** [From the stratosphere to the ionosphere.] Paris, Presses Universitaires de France, **1942.** 154 p. 38 figs., 2 tables, 8 plates, 7 refs. **DWB**—A pocket-size text reviewing knowledge up to date (1942) of the composition, structure, electrical properties, movements, controls and effects of the upper atmosphere. The sections on ozone, the aurora, ionosphere, methods of sounding and cosmic influences are fairly technical but easily understood by the layman. Some good photographs and schematic diagrams as well as illustrative tables are included. *Subject Headings:* **1. Stratosphere 2. Ionosphere 3. Textbooks.**—*M.R.*

3.1–70 551.510.5:001

Nicolet, Marcel, **Propositions pour une nomenclature de la haute atmosphère.** [Proposals for nomenclature of the upper atmosphere.] *Annales de Géophysique*, 6(4):318–321, Oct.–Dec. **1950. DBS**—On the basis of temperature characteristics the stratosphere is the almost isothermal region above the troposphere; the mesosphere is the region between the stratosphere and the minimum temperature below 100 km.; the thermosphere the region of increasing temperature above this minimum. On the basis of composition the atmosphere is divided into hemosphere, which extends to about 100 km. above the ground, and heterosphere, characterized by a different composition. The turbosphere is the region of the atmosphere where turbulence predominates over diffusion. Using the concentration of electrons as a criterion of classification the neutrosphere and ionosphere are obtained. *Subject Headings:* **1. Upper atmosphere 2. Definitions.**—*I.L.D.*

3.1–71 551.510.53:551.590.25

Bumba, V. and Link, F., **Études météoriques.** [Meteor studies.] *Czechoslovakia, Pražsdá Státní hvězdárna, Publikace*, No. 20, **1948.** 8 p. 2 diagrs., refs. In French, Czech summary p. 8. **DWB**—Exploration of the upper atmosphere by study of meteor trails should profit by the method of classifying meteors according to 6 classes (A-F) based on visibility for

any given height of appearance or disappearance. Tables give height and frequency data for 3000 cases. *Subject Headings:* **1. Meteor trails 2. Upper atmosphere research.**—*M.R.*

3.1–72 551.510.535:621.396.1

Argence, E., Mayot, M. and Rawer, Karl, **Contribution à l'étude de la distribution électronique de l'ionosphère et de l'absorption des ondes courtes.** [Contribution to the study of distribution of electrons in the ionosphere and the absorption of short waves.] *Annales de Géophysique*, 6(4):242–285, Oct.–Dec. **1950.** 13 figs., 9 tables, 23 refs., equations. English and French summaries p. 242. **DBS**—From a study of the absorption of reflected and transmitted radio waves, occurring during the collision of electrons with neutral molecules, the authors derive approximate formulas for calculating the absorption decrement δ_2 for complex layers. The models of atmospheric ionization of CHAPMAN, NICOLET, and BOSSY are generalized and models with different variations of temperature with height are developed. By the use of recent data or temperature and dissociation of O_2 the authors consider the problem 1) of parabolic variations of temperature below 100 km. and 2) of a rapid decrease of ionizable molecules above this height. The significance of ionization to D and E layers is discussed. *Subject Headings:* **1. Ionosphere 2. Electron distribution 3. Radio waves.** - *I.L.D.*

3.1–73 551.510.535

Barré, M. and Rawer, Karl, **Une perturbation ionosphérique extraordinaire observée en terre Adélie.** [An extraordinary ionospheric disturbance observed in Adélie Land.] *Annales de Géophysique*, 6(4):309–317, Oct.–Dec. **1950.** 7 figs. French and English summaries p. 309. **DBS**—A detailed analysis of the ionospheric disturbance that was observed at Adélie Land and in its vicinity between Feb. 2 and 5, 1950. The high absorption occurring in a limited region of the atmosphere is attributed to increased ionization in the D as well as in the F2 layer. *Subject Headings:* **1. Ionospheric disturbances 2. F layer 3. Adélie Land.** - *I.L.D.*

3.1–74 551.510.535

Chapman, Sydney, **Note on a supposed determination of the lunar diurnal tide in the ionosphere.** *Journal of Meteorology*, 8(2):133–134, April **1951.** 4 refs. Reply by M. W. and J. G. JONES p. 134. refs. **MH-BH**—Criticism of paper by JONES and JONES "Tidal effects in the ionospheric F-layer" (*see item* No. 5–32 in May 1950 *Meteorological Abstracts*) and reply by the original authors. The errors are believed due to the limited amount of data and the inhomogeneity of the general behavior of ionospheric phenomena in the Arctic. PROF. CHAPMAN claims that accidental causes could give a spurious lunar variation exceeding the probable error by 50%. *Subject Headings:* **1. Lunar diurnal ionospheric tides 2. Ionospheric tides 3. Lunar influences. I. Jones, M. W. II. Jones, J. G.**—*M.R.*

3.1–75 551.510.535:550.38

Scott, James C. W., **Longitudinal and transverse propagation in Canada.** *Journal of Geophysical Research*, 55(1):65–84, March **1950.** 13 figs., table, 8 refs., equations. **MH-BH**—Multifrequency pulse measurements north of auroral zone in Canada show that the ionosphere is very turbulent and unstable. The echoes are peculiar and longitudinal. The causes are discussed. The apparent magnetic field is calculated; it shows large diurnal and seasonal variation. *Subject Headings:* **1. Ionospheric structure 2. Terrestrial magnetism.** *C.E.P.B.*

3.1–76 551.510.535:538.56

Westfold, K. C., **The interpretation of the magneto-ionic theory.** *Journal of Atmospheric and Terrestrial Physics*, 1(3):152–186, **1951.** 7 figs., 24 refs., 65 equations. **MH-BH**—Author discusses applications of Appleton-Hartree formula for conditions of propagation of a plane electromagnetic wave. When collision frequency is small compared with wave frequency, solutions present a complete mathematical picture of dielectric constant and polarization, from which behavior of refractive index and absorption coefficient can be derived. This and other results are applied to propagation in the solar atmosphere. *Subject Headings:* **1. Electromagnetic waves 2. Ionization 3. Solar atmosphere.**—*C.E.P.B.*

MECHANICS AND THERMODYNAMICS OF THE ATMOSPHERE

(*See also item:* 3.1–125)

3.1–77 551.511:551.578.7

Asnani, G. C., **Computation of convergence in a hailstorm situation.** *Indian Journal of Meteorology and Geophysics*, 2(1):65–67, Jan. 1951. 4 figs., 6 refs. **MH-BH**—Divergence charts for heights 3000, 5000, 10,000 and 15,000 ft. above sea level were prepared in order to determine to what extent the method of calculating convergence from u, v isopleths can account for a specific, locally observed hailstorm. *Subject Headings:* **1. Convergence 2. Hailstorms.**—*I.L.D.*

3.1–78 551.511:551.513.1

†Berson, F. A., **On the factors controlling the instability of long waves in zonal currents.** *Arkiv för Geofysik*, 1(9):187–236, **1950.** 13 figs., tables, refs., 35 equations. **MH-BH**—A general investigation into the instability of long waves and the growth of disturbances. After considering present theories of long wave instability, polytropic pressure perturbations and transformations of the vorticity equation, Sec. 4 discusses factors controlling long wave stability. Author concludes that perturbations in baroclinic zonal currents in middle and high latitudes grow at a rate depending on wave length, latitude and Richardson number. All but very long waves are unstable in winter. Formation of jet stream is related to increasing large scale turbulence. The results are qualitatively verified from contours and isotherms of 500 mb. surface, Feb. 12, 14, 1948. The paper includes a discussion of much recent literature. *Subject Headings:* **1. Atmospheric circulation 2. Instability.**—*C.E.P.B.*

3.1–79 551.511

Eady, E. T., **The theory of development in dynamical meteorology.** *International Union of Geodesy and Geophysics, Association of Meteorology, Transactions, Oslo 1948*, 2:72–81, **1950.** Mimeographed. **DWB**—The results of solution of the equations of motion, representing the beginning stages of development of large scale disturbances in a rotating baroclinic atmosphere, are discussed in nonmathematical language. The characteristics and relationships of the two principal types of dominant disturbances outside the tropics, namely the characteristic forms of breakdown of a baroclinic cloud mass with wave length 500–2000 km. and the characteristic form of breakdown of entire tropospheres are described. The procedure of deriving perturbation equation for simple small scale systems in which the variability of the Coriolis factor is neglected and constant mean values are used, and the use of a polar system of coordinates for studying long general circulation waves are outlined. *Subject Headings:* **1. Dynamic meteorology 2. Atmospheric disturbances.**—*I.L.D.*

3.1–80 551.511:551.55

Gleeson, Thomas A., **On the theory of cross-valley winds arising from differential heating of the slopes.** *Florida State University, Dept. of Meteorology, Technical Report*, April **15, 1951.** 44 p. 9 figs., 12 refs., 26 equations. **DWB** –By means of equations of horizontal motion and astronomical considerations, expressions are derived from a cross-valley wind caused by differential solar heating on opposite slopes. Friction, inertia, the Coriolis force, the time of the day and year, the latitude and orientation of the valley, and the inclinations of the slopes are independent variables in these expressions. Absolute wind speeds cannot be determined by this theory, but directions and variations in speed may be studied. Several examples, illustrating effects of the independent variables on the cross-valley wind, are discussed and a comparison of observation with theory is made for a specific valley. *Subject Headings:* **1. Valley winds 2. Solar radiation 3. Topographic effects I. Florida State University. Dept. of Meteorology.**—*Author's abstract.*

3.1–81 551.511

Lowell, S. C., **The boundary conditions at the tropopause.** *Tellus*, 3(2):78–81, May **1951.** 2 refs., 22 equations. **MH-BH**—The discontinuity surface at the tropopause does not have the characteristics of a surface which moves with the speed of sound, so it must move with the

atmosphere itself. In this respect it acts like a front. By solving the equations for discontinuities of this type, it is seen that at the tropopause 1) the pressure gradient is continuous, 2) there is no difference in acceleration of particles on either side, 3) no velocity convergence or divergence, 4) the vertical wind shear is normal to the tropopause and 5) the change in mass divergence is proportional to change in temperature lapse rate to the solenoidal term, to the wind component perpendicular to the tropopause, etc. *Subject Headings:* **1. Tropopause 2. Discontinuities 3. Dynamics of the atmosphere.**—*M.R.*

3.1–82 551.511

Truesdell, C., **Proof that Ertel's vorticity theorem holds in average for any medium suffering no tangential acceleration on the boundary.** *Geofisica Pura e Applicata*, 19(3–4): 167–169, **1951.** figs., 4 refs., 9 equations. In English, English and German summaries p. 167. **MH-BH**—A kinematical analysis is made, with differential equations included, to show that ERTEL's vorticity theorem still holds: 1) on the average, in motions of viscous fluids, in a finite stationery system, because of adherence of the liquid to the boundary surface, 2) on the average when there is a continuous motion of any medium over a region V on whose boundaries the medium undergoes no tangential acceleration and 3) in several other special cases. In a domain on whose boundaries the material suffers no tangential acceleration, there is on the average no diffusion of vorticity. *Subject Headings:* **1. Vorticity theory 2. Mechanics of the atmosphere.**—*M.R.*

3.1–83 551.511

Van Mieghem, Jacques and Vandenplas, A., **Les équations de la dynamique atmosphérique en coordonées généralisées. Application au cas des coordonnées sphériques.** [The equations of atmospheric dynamics in generalized coordinates. Application to the case of spherical coordinates.] *Belgium, Institut Royal Météorologique, Mémoires*, Vol. 41, **1950.** 57 p. 3 figs., 10 refs., equations. **DWB**—The object is to establish the Eulerian and rotational forms of equations of atmospheric dynamics on any arbitrary moving system of curvilinear coordinates. After defining speed, acceleration, divergence and rotation the Eulerian and rotational forms of the equations of motion are derived. These are applied to the classical equations in Cartesian coordinates and to spherical coordinates fixed by reference to the earth, including those in which the axis corresponds to any diameter. Finally, the case is examined of an isolated circular whirl with vertical axis moving under the influence of the horizontal Coriolis force. *Subject Heading:* **1. Dynamic meteorology.**—*C.E.P.B.*

3.1–84 551.511

Van Mieghem, Jacques, **Le mouvement des tourbillons atmosphériques.** [Movement of atmospheric vortices.] *Tellus*, 3(2):75–77, May **1951.** 5 refs., 9 equations. English summary p. 75. **MH-BH**—The force which acts on an atmospheric vortex depends on its intensity, the Coriolis parameter and the latitude effect on this parameter. The zonal, meridional and vertical components of this force are linear functions of two correlations: one between the corresponding component of the air velocity and the horizontal divergence of the current and the other between this same first component and the meridional component of the velocity. *Subject Headings:* **1. Vortexes 2. Mechanics of the atmosphere.**—*Author's abstract.*

GENERAL CIRCULATION

(*See also items:* 3.1–78, 3.1–90, 3.1–158)

3.1–85 551.513:551.515.11:532.59

Queney, Paul, **Ondes atmosphériques associées aux discontinuités du tourbillon (ondes planetaires et ondes de cyclone).** [Atmospheric waves associated with cyclonic discontinuities (planetary and cyclonic waves).] *Académie des Sciences, Paris, Comptes Rendus* 232(21):1954–1956, May 21, **1951.** 4 equations. **DWB**—The author considers adiabatic nondivergent waves superposed upon currents of the general circulation at elevations of 11 km. where the energy of this circulation is a maximum. *Subject Headings:* **1. General circulation 2. Atmospheric disturbances.**—*I.L.D.*

3.1–86 550.513.1

Gulmet, B. and Zonzon, J., **Note sur la météorologie tropicale.** [Note on tropical meteorology.] *La Météorologie*, 4th Ser., No. 21:32–48, Jan.–March **1951.** 9 figs. French, English and Spanish summaries p. 32. **MH-BH**—The author summarizes: 1) the physical and dynamic properties of tropical air masses and air currents, 2) the methods of analysis employed in the intertropical zone and 3) the properties of the principal types of tropical circulation observed over the North Atlantic and the Caribbean, namely, the steady trades and the equatorial current and disturbances in the trade. *Subject Headings:* **1. General circulation 2. Tropical meteorology 3. Air masses 4. Caribbean Sea 5. North Atlantic Ocean.**—*I.L.D.*

3.1–87 551.513.1

Mintz, Yale, **On the kinematics and thermodynamics of general circulation of the atmosphere in the higher latitudes.** *American Geophysical Union, Transactions*, 28(4):539–544, Aug. **1947.** 6 figs., 4 refs. **DWB**—Author devised a schematic 3-dimensional representation of helical motion in waves in the westerlies, showing ascent near the troughs and descent near the ridges. Cooling at low pressures in high latitudes and heating at high pressures in low latitudes forms an engine generating kinetic energy at the calculated rate of 7 joules/sec./m.^{2} compared with a rate of dissipation of about 5 joules. *Subject Heading:* **1. Atmospheric circulation.**—*C.E.P.B.*

3.1–88 551.513.2

§van der Ham, C. J. and Kuipers, W. J. A., **Karakteristieke weertypen V. De noordwestelijke circulatie.** [Characteristic weather types V. The northwesterly circulation.] *Hemel en Dampkring*, 49(5):97–98, **1951.** 4 figs. **DLC**—A short exposition of the weather conditions which occur in Holland during NW type air flow in the various seasons, with illustrations from synoptic charts drawn during the last 4 years. *Subject Headings:* **1. Weather types 2. Netherlands.**—*M.R.*

ATMOSPHERIC DISTURBANCES

(*See also items:* 3.1–18, 3.1–56, 3.1–60, 3.1–85)

3.1–89 551.515:551.582(4)

†Rex, Daniel F., **The effect of Atlantic blocking action upon European climate.** *Tellus*, 3(2):100–111, May **1951.** 8 figs., table, refs., 5 equations. **MH-BH**—Six cases of blocking action over the Atlantic (1935–1950) are analyzed from the point of view of duration (14–31 days), season, location, surface and upper air pressure distribution, rainfall and temperature anomalies, etc. A composite chart is drawn for the average of all the winter cases, the summer cases and all cases respectively, as compared with a case of strong zonal flow over Europe. Charts also show the winter and the summer anomaly of temperature and precipitation for the blocking cases. Effects on climate over the past century suggest possible effects over longer periods, but do not explain mechanism or cause of changes. *Subject Headings:* **1. Blocking action 2. Climatic variations 3. Europe.**—*M.R.*

3.1–90 551.515:551.513.1

Van Mieghem, Jacques, **L'équation aux dérivées partielles de la pression de perturbation associée aux ondulations de grande longueur d'onde du courant géostrophique zonal.** [Equation with partial derivatives of pressure disturbances associated with undulations of great wave length of the zonal geostrophic current.] *Belgium, Institut Royal Météorologique, Mémoires*, Vol. 39, **1950.** 45 p. 2 tables, 8 refs., 93 equations. **MH-BH**—Author sets out the details of the calculations for the article "Hydrodynamic instability" in the Compendium of Meteorology published by the American Meteorological Society. Approximate equations of the dynamics of long waves are established and it is shown that most of the simplifying hypotheses, commonly introduced, are inacceptable and often incorrectly applied. The calculations refer especially to distorted unstable waves. *Subject Headings:* **1. Atmospheric circulation 2. Atmospheric disturbances.**—*C.E.P.B.*

3.1–91 551.515.1:656.6(73)

Meier, Frank, **Hurricane warning; notable storms involving sailing ships on our sea coast and Great Lakes.** New York, Dutton, **1947.** 254 p. photos. Price $3.50. **DWB**—Popular accounts of twenty storms which caused great damage or loss of life in various coastal areas of the United States, from Maine to the Gulf, on the Pacific Coast and the Great Lakes. *Subject Headings:* **1. Storm 2. Marine disasters 3. United States.**—*M.R.*

3.1–92 551.515.11:551.515.71

Hollmann, Günther, **Über die Instabilität planetarischer Wellen und ihre Bedeutung für die Entstehung stationärer Druckgebilde.** [On the instability of planetary waves and their importance for the development of stationary pressure formations.] *Zeitschrift für Meteorologie*, 5(4):97–101, April **1951.** 3 figs., 22 refs., 3 equations. **MH-BH**—Change of pressure distribution is made up of translation of an existing field and new developments, the latter due to instability of planetary waves. Instability in a baroclinic atmosphere leads to increasing amplitude and eastward motion. Author describes a mechanism by which, in a barotropic atmosphere, amplitude can increase while the latitude effect inhibits eastward motion. This leads to the development of stationary fields of high and low pressure and a change from zonal to meridional type with blocking of travelling disturbances. *Subject Headings:* **1. Dynamics of the atmosphere 2. Anticyclones 3. Instability.**—*C.E.P.B.*

3.1–93 551.515.11

Kleinschmidt, Ernst, jun., **Über Aufbau und Entstehung von Zyklonen. III Teil.** [On origin and development of cyclones. Pt. III.] *Meteorologische Rundschau*, 4(5–6):89–96, May–June **1951.** 4 figs., 5 refs. **MH-BH**—For Pt. I and II *see abstract* No. 11–70 in Nov. 1950 *Meteorological Abstracts*. In Pt. III the distribution of ERTEL's Z-factor at isentropic surfaces is considered in relation to the pressure field and the horizontal air-motion. Charts for depression of Dec. 17–18, 1949, are analyzed for 3 isentropic layers. It is concluded that the primary factor in a depression is an air-mass immediately below the stratosphere with high values of Z. An appendix describes the calculation of Z. *Subject Headings:* **1. Cyclone structure 2. Isentropic analysis.**—*C.E.P.B.*

3.1–94 551.515.2(932)

Dartigues, P., **Passage d'un cyclone sur la Nouvelle Calédonie.** [Passage of a cyclone over New Caledonia.] *France, Ministère de la Défense Nationale, Comité Central d'Oceanographie et d'Études des Côtes (C.O.E.C.), Bulletin d'Information*, 3(6):187–190, June **1951. DWB**—The chronology of the phenomenon and a brief description of its behavior are given. *Subject Headings:* **1. Tropical cyclones 2. New Caledonia.**

3.1–95 551.515.2:551.515.8(54)

Desai, B. N., **Some aspects of tropical meteorology with special reference to the Indian weather · An examination of Malurkar's concepts regarding them.** *Indian Journal of Meteorology and Geophysics*, 2(2):113–120, April **1951.** fig., table, 21 refs. **MH-BH**—The approximate normal position of the Intertropical Front between 50°E. and 100°E. longitude, during the various months of the year, is illustrated on a map. *Em* (recurved trade), *Tc* (continental air) and *Tm* (tropical maritime) air masses are not always necessary for the formation of tropical depressions or cyclones which depend also upon orography and distribution of land and water. Usually, it is not possible for *Tm* air to move far in the Far East in the lower levels to the north of lat. 18°N., owing to the high mountains on the northeast. The passage of low pressure areas across the equator carrying *Em* air is not supported by evidence. The activity of western disturbances is not necessarily influenced by cyclones in the Southern Hemisphere. Very heavy rain in connection with tropical depressions or cyclones is not associated usually with the turning of *Tm* northward coupled with a fresh *Tc* air mass. *Subject Headings:* **1. Tropical cyclones 2. Air masses 3. Tropical meteorology 4. India I. Malurkar, S. L.**—*I.L.D.*

3.1–96 551.515.2 551.506.2(261)

§Norton, Grady, **Hurricanes of the 1950 season.** *Monthly Weather Review*, 79(1):8–15, Jan. 1951. 9 figs., ref. **DWB**—During the hurricane season of 1950 there were 12 storms in the western North Atlantic. Each of these are described and the most important are analyzed in detail, with reproductions of synoptic charts, charts showing the storm path and barograph traces from Miami. *Subject Headings:* **1. Hurricanes 2. Synoptic analysis 3. Hurricane tracks 4. North Atlantic Ocean.**—*M.R.*

3.1–97 551.515.2(679)

Rodewald, Martin, **Tropische Orkane im Kanal von Mozambique.** [Tropical hurricanes in the Mozambique Channel.] *Wetterlotse*, Hamburg, No. 19:6–8, March **1951. DWB** –A description of two severe storms that occurred in Dec. 1950 and Jan. 1951. *Subject Headings:* **1. Hurricanes 2. Mozambique Channel.**

3.1–98 551.515.22(265.5)(261)

Webster, V. G. K. and Moore, D., **Tropical storms.** *Marine Observer*, 21(153):157–158, July **1951. DWB**—Brief accounts of hurricanes in N. Atlantic Aug. 13, 1950 and S. Pacific Sept. 13, 1950. *Subject Headings:* **1. Tropical cyclones 2. North Atlantic Ocean 3. South Pacific Ocean.**—*C.E.P.B.*

3.1–99 551.515.3(437)

Fikar, Jan, **Větrná smršť dne 20. dubna 1950.** [The tornado of April 20, 1950.] *Meteorologické Zprávy*, 4(3–4):80–82, **1950.** 8 figs., 2 plates. In Czech. **DWB** –Photographs showing damage to several houses and schematic diagrams showing appearance of funnel cloud at 5 different stages are included along with a detailed description of circumstances of and damage from tornado that hit several towns in Czechoslovakia between the Moldau and Elbe rivers (north of Prague), chart shows path and places where damage occurred (Bohnice, Sedlec, Kojetic, Bast, etc.). Personal accounts of many observers are included. *Subject Headings:* **1. Tornadoes 2. Tornado damage 3. Czechoslovakia.**—*M.R.*

3.1–100 551.515.3(764)

Hall, Roy S., **Inside a Texas tornado.** *Weatherwise*, 4(3):54–57, 65, June **1951.** 2 figs. **MH-BH** –A graphic description of the vortex of a tornado as viewed by a trained meteorologist. *Subject Headings:* **1. Vorticity 2. Tornadoes 3. Texas.**

3.1–101 551.515.7:523.74(7)

*Schell, I. I., **The sun's spottedness as a possible factor in the frequency of anticyclones in northwestern North America.** *American Meteorological Society, Bulletin*, 30(8):292–294, Oct. **1949.** 3 tables, 4 refs. **DWB**—Data for 15 year period (1930–1944) show that the absolute sunspot number, not the increase (as determined from 2-day increase in sunspot number), correlates the best with number of anticyclone centers at Dawson, Yukon Territory. *Subject Headings:* **1. Sunspots 2. Anticyclones 3. North America.**—*M.R.*

3.1–102 551.515.8(813)

MacHattie, L. B., **Intense warm frontal passage at Rockcliffe.** *Canada, Meteorological Div., Local Forecast Study* No. 5, *Cir.* 1945, May **1951.** 6 p. fig., 2 tables, 4 refs. **MH-BH**—Forty passages of sharp warm fronts in 1945 are tabulated with temperature change (mean 6.2°F.) and wind shift (usually ENE–SSW, mean 128°). The sharpness is attributed to development of an eddy wind in the cold air trapped in Ottawa River valley. *Subject Headings:* **1. Warm fronts 2. Frontal analysis 3. Rockcliffe, Ontario.**—*C.E.P.B.*

3.1–103 551.515.8(265)

*§Palmer, C. E. and Sherman, Leon, **The tropical Pacific project.** *California, University, Institute of Geophysics, Report* No. 7, Jan. **1950.** 9 p. 7 figs., 2 tables. Mimeographed. Palmer, C. E.; Sherman, Leon and Dean, Gerdow, *ibid., Report* No. 11, Jan. **1951.** [8 p.] 12 figs., tables, refs. **DWB** –A synoptic statistical and aerological study of 167 cases of fronts

reported by aircraft in the Bikini area during May–July 1946, to see if they were tied in with the equatorial or intertropical front or convergence zone, if such really exists. Also an attempt is made to determine objective relationships in connection with easterly waves or troughs. Charts and cross sections show cloud systems encountered and stream lines of air flow on days when unusual conditions were reported. *Subject Headings:* **1. Synoptic aerological studies 2. Tropical fronts 3. Airways forecasting 4. Bikini 5. Tropical Pacific. I. Contract AF W28-099 ac-385. II. Dean, Gerdow.**—*M.R.*

3.1–104 551.515.8:551.509.532(71)

§Tyner, R. V., **Polar outbreaks into the Okanagan valley and southern coast of British Columbia.** *Canada, Meteorological Div., Local Forecast Study* No. 3, *Cir.* 1919, April 3, **1951.** 3 p. 2 figs., 12 charts. **MH-BH**—Record cold outbreaks are analyzed with charts and tephigrams—Jan. 25–26, 1951 (primary outbreak) and Jan. 14–15, 23–24 and 30–31, 1950 (secondary outbreak). Favorable conditions are very cold air over northern and central British Columbia and an eastward moving low south of Okanagan Valley. *Subject Headings:* **1. Polar outbreaks 2. Frost 3. British Columbia.**—*C.E.P.B.*

RADIATION AND TEMPERATURE

RADIATION

3.1–105 551.521.1:550.38

Chapman, Sydney, **Solar influences on the earth's magnetism and on the upper atmosphere.** *Commission pour l'Étude des Relation entre les Phénomenès Solaires et Terrestres, Rapport,* Orléans, No. 6:65–68, **1948.** In English. **MH-BH** Brief summary of author's work on various relations of solar physics with geomagnetism, ozone layer, etc. *Subject Headings:* **1. Solar radiation 2. Terrestrial magnetism.**—*C.E.P.B.*

3.1–106 551.521.1:551.586:69

King, E., **Wiederaufbau und Besonnungsverhältnisse von Bauwerken.** [Rebuilding and insolation of buildings.] *Baden, Landeswetterdienst, Jahresbericht mit Abhandlungen,* **1950.** p. 16–30. 7 figs., 7 tables, 4 refs. **DWB**—Sets out hourly tables and diagrams: intensity of total radiation at Baden-Baden on surfaces normal to sun's rays, clear sky; sunshine duration at Freiburg; elevation and azimuth of sun; radiation on vertical walls facing in 16 different directions; and effect of shading by opposite houses. *Subject Headings:* **1. Insolation 2. Bioclimatology 3. Building construction.**—*C.E.P.B.*

3.1–107 551.521.1:551.586:634.9

Lossnitzer, H., **Das Strahlungsklima des Schwarzwaldrandes.** [Radiation climate of the Black Forest margin.] *Baden, Landeswetterdienst, Jahresbericht mit Abhandlungen,* **1950.** p. 58–65. 6 figs., 4 tables. **DWB**—From observations mainly at Freiburg and Baden-Baden author shows in tables and diagrams: LINKE's turbidity factor in relation to sun height, intensity and diurnal variation of sun, and sky radiation on days of different cloudiness and haziness, UV radiation, sky color and polarization of zenith light. *Subject Headings:* **1. Radiation climate 2. Black Forest, Germany.**—*C.E.P.B.*

3.1–108 551.521.1:551.582.1(471.0)

Lunelund, Harald, **Radiation climate of Finland.** *International Union of Geodesy and Geophysics, Association of Meteorology, Transactions, Oslo 1948,* Vol. 2:115–122, **1950.** 5 figs., 8 refs. Mimeographed. **DWB**—Solar radiation records in Finland are obtained with the bimetalactinometer of MICHELSON-MARTENS, controlled by the compensation pyrheliometer of ÅNGSTRÖM and also with the silver disc actinometer of the Smithsonian Institution. AUREN and GORCZYŃSKI pyrheliometers are also used. ÅNGSTRÖM, GORCZYŃSKI and AUREN solarigraphs and pyrometers are used to measure global radiation. Maps showing the number of sunshine hours per year in Finland, the annual sun and sky radiation for horizontal surface, calculated with regard to cloudiness, and the cooling factor are shown. *Subject Headings:* **1. Climatology 2. Solar radiation 3. Radiation instruments 4. Finland.**—*I.L.D.*

3.1–109 551.521.13:517.512.2

Abbot, Charles Greeley, **Montezuma solar-constant values and their periodic solar variations.** *Smithsonian Miscellaneous Collections*, 111(7), April 19, **1949.** 13 p. 3 figs., 2 tables, 7 refs. **MH-BH**—Gives a table of 10-day and monthly mean values of solar constant at Montezuma 1923–1947. Monthly values are shown graphically and are found to be largely accounted for by 14 periodicities all submultiples of 273 months. Graphical method of identifying periodicities is described and a list given. *Subject Headings:* **1. Solar radiation 2. Periodicities I. Chile. Montezuma Observatory.**—*C.E.P.B.*

3.1–110 551.521.4

Bricard, J. and Kastler, A., **Polarisation des radiations monochromatiques du ciel nocturne et de la raie D crépusculaire.** [Polarization of monochromatic radiation of the night sky and the crepuscular D ray.] *Annales de Géophysique*, 6(4):286–299, Oct.–Dec. **1950.** 18 figs., 20 refs. French and English summaries p. 286. **DBS**—A method for detecting night and twilight sky radiation without the use of a spectrograph is described. Instead interference bands produced by quartz crystals in monochromatic light are photographed with filters and suitable plates. If the incident light is polarized the bands appear even without a polarizer. The red and green rays of the night and twilight sky are polarized only very slightly. The continuous background associated with yellow light is eliminated by receiving the interference bands through the slit of a dispersive spectrograph. *Subject Headings:* **1. Light of the night sky 2. Nocturnal radiation.**—*I.L.D.*

3.1–111 551.521.64

Beiser, Arthur, **New light on the origin of cosmic rays.** *Physics Today*, 4(7):14–16, July **1951. DWB**—A brief article outlining the two theories as to origin of cosmic rays which have been current during the past two decades: 1) the theory that the radiation is of cosmic or interstellar origin and 2) of solar origin. A new theory, which combines these two concepts, attributed to Enrico Fermi extends the ideas of Alfvén regarding wandering magnetic clouds in space. The particles already having greater than normal energy will be either speeded up or slowed down by these magnetic clouds, depending on direction of impact and those which are speeded up become the high energy cosmic rays. Frequency of protons in cosmic rays also can be predicted by this theory. *Subject Headings:* **1. Cosmic ray origin 2. Solar radiation.**—*M.R.*

3.1–112 551.521.64:550.385

Parkash, Om and Sarna, H. R., **On the storm variations of cosmic ray intensity.** *East Panjab University, Research Bulletin, Physics*, No. 10:111–116, Nov. **1950.** 14 refs. **DWB**—Effects of magnetic storms on cosmic ray intensity, as determined from research done for two months in India. Correlation based on cosmic ray data obtained in 1947 at Lahore and magnetic data from Bombay were not significant except on two extremely disturbed days when results were marked but opposing in sign on the two respective days. *Subject Headings:* **1. Cosmic ray intensity 2. Magnetic storms 3. India.**—*M.R.*

TEMPERATURE

(*See also items:* 3.1–21, 3.1–25, 3.1–118, 3.1–119, 3.1–121, 3.1–130, 3.1–159)

3.1–113 551.524.33:551.506.3

*Grisollet, H., **Caractères statistiques des relations de température entre saisons consécutives à Paris.** [Statistic characteristics of the relations of temperature between consecutive seasons at Paris.] *La Météorologie*, 4th Ser., No. 21:6–18, Jan–March **1951.** tables, refs. French, English and Spanish summaries p. 6. **MH-BH**—Using the climatic data for Paris for the interval 1800–1947, the author examines the presistence of temperature between successive seasons. Mean seasonal temperatures and mean seasonal deviations have been calculated. The assumption that seasonal temperatures persist was subjected to Chi square test. It was found that very hot summers are followed by mild autumns. *Subject Headings:* **1. Seasonal temperature variations 2. Long period records 3. Paris, France.**—*I.L.D.*

3.1–114 551.524.36:551.509.53

Longley, R. W., **A study of the differences of the temperature extremes at selected stations in the Montreal forecast regions.** *Canada, Meteorological Div., Local Forecast Study* No. 4, *Cir.* 1927, April 14, **1951.** 3+p. 6 tables. **MH-BH**—Differences between maximum and minimum temperatures at Quebec or Ottawa and at various other stations in April, July and December were tabulated as quantiles and extreme values. Meteorological conditions giving rise to the latter are listed. *Subject Headings:* **1. Temperature extremes 2. Freezing temperatures 3. Canada.**—*C.E.P.B.*

3.1–115 551.524.37:551.509.53

*Brablec, Josef, **Pokus o znázornění nebezpečí mrazů v době vegetační.** [An attempt to demonstrate the danger of frost during the vegetation season.] *Meteorologické Zprávy*, 4(3–4):57–60, **1950.** 3 figs., tables, 5 refs. In Czech. **DWB**—Based on data for 1925–1944, charts and tables were prepared to show the local differences in the beginning of the growing season and in the extent of the frost-danger period. In some regions where frost danger occurs late in the season, the growing season (as defined by days with mean temperature $\leqslant 10°C.$) begins early. In other regions there is more correlation between the two, hence the danger of frost damage is not so acute. *Subject Headings:* **1. Frost danger 2. Growing season 3. Czechoslovakia.**—*M.R.*

3.1–116 551.524.37:635

Bush, Raymond, **Frost and the fruit grower.** 3rd ed. London, Cassell, **1947.** 120 p. 23 plates, 15 diagrs., tables, graphs. Price $2.50. **DWB**—A thorough treatment, from the point of view of the English horticulturist, of the problem of frost prevention or avoidance. The behavior of cold air in uneven country, or with respect to trees, shrubs, shelter-belts and other natural or artificial obstacles, is dealt with in a number of chapters with many photographs and schematic diagrams. Frost pockets, slopes, radiation, orchard heating, artificial circulation of air, susceptibility of particular varieties and measuring degree of frost or damage, comprise other chapters. *Subject Headings:* **1. Frost prevention 2. Horticulture.**—*M.R.*

3.1–117 551.524.37:551.508.29

Uhlíř, Pavel, **Samočinné zařízení na ochranu proti jarním mrazům.** [Automatic device for protection against spring frosts.] *Meteorologické Zprávy*, 4(3–4):90–92, **1950.** 3 figs. In Czech. **DWB**—An electrical wiring scheme was worked out in connection with an anemometer and thermostat to provide for automatic lighting of smudge pots (oil) when conditions become favorable for radiation frost in the spring. The article and illustrations are taken in part from the paper by H. Parrenin (*La Météorologie*, 1948, p. 209–228). The thermostat is controlled by a radiation balance meter. *Subject Headings:* **1. Frost protection 2. Orchard heating 3. Radiation balance I. Parrenin, H.**—*M.R.*

ATMOSPHERIC PRESSURE AND WIND

PRESSURE

(*See also item:* 3.1–26)

3.1–118 551.547:551.524.7

*Brier, Glenn W., **Interrelation of pressure, temperature, and density in the upper air for North America.** U. S. Weather Bureau, **1945.** 10+p. 104 figs., tables, refs., 7 equations. Typescript. **DWB** Voluminous statistical data are presented from an analysis of radiosonde data (1938–44) in tabular and graphic form. Methods of analysis are presented in detail, but interpretation is limited to a few brief conclusions regarding correlations of pressure, density, temperature, pressure and density, and pressure and temperature. A short article by J. Namias on the geographical distribution of interdiurnal variations of temperature and pressure is included. *Subject Headings:* **1. Statistical studies 2. Pressure-temperature correlations 3. Radiosonde data. I. Namias, Jerome.**—*M.R.*

3.1–119 551.547:551.524

§Namias, Jerome, **Geographical distribution of certain statistics on the interdiurnal variations of temperature and pressure.** U. S. Weather Bureau, **1944.** 2+p. 8 figs. **DWB**—Charts of the Western Hemisphere show for lat. 25°–75° the geographical distribution of the standard deviation of pressure at 3 km., 6 km., the correlation between pressure and temperature at 3 km. and 6 km., the regression of pressure on temperature at 3 and 6 km., and the ratio of the standard deviation of pressure at 3 km. to the standard deviation of temperature at 3 km., for the months of December, January and February. Isolines bring out sharply the patterns, and actual data and number of observations on which based, are presented for each radiosonde station. Charts most useful for forecasting pressure patterns from temperatures in maritime regions—least valuable in east slope of Rockies. *Subject Headings:* **1. Pressure-temperature correlations 2. Statistical studies 3. North America.**—*M.R.*

3.1–120 551.547.2(02)

U. S. Air Weather Service, **Barometry.** *U. S. Air Weather Service, Manual* 105–15, Sept. **1950.** 42+p. 6 figs., 8 tables. **DWB**—A manual for use of Air Weather Service observers in computing and checking pressure observations either at the surface or in flight. Tables are given for reducing pressure to sea level, or for correcting altimeters and instruction given for checking barometers. The manual contains many examples and actual nomograms or tables for computation. *Subject Headings:* **1. Barometry 2. Altimeter correction 3. Observers manuals.**—*M.R.*

WIND

(*See also item:* 3.1–80)

3.1–121 551.55:551.524:551.526.6

Bintig, Paul, **Der Einfluss des Windes auf die Wassertemperatur des Ozeans und ihr Zusammenwirken mit der Lufttemperatur. 2. Mitteilung.** [The influence of wind on water temperature of the ocean and its connection with the air temperature. Pt. 2.] *Annalen der Meteorologie*, 3(11/12):333–340, **1950.** 6 figs., 4 refs., 5 equations. German and English summaries p. 333. **MH-BH**—For Pt. 1 *see abstract* No. 2.3–110 in March 1951 *Meteorological Abstracts*. Pt. 2 discusses temperature difference air-water (ΔT) in Biscay and North Atlantic. Various expressions are deduced for it in terms of rate of change and gradient of air temperature. Day and night observations are compared for different wind forces to eliminate radiation effects and ΔT wind roses are constructed and compared with direction of isotherms. The diurnal variations of air and water temperature are analyzed harmonically and in terms of wind speed and cloudiness; the amplitudes of both and of ΔT decrease linearly with increasing wind speed. *Subject Headings:* **1. Wind effects 2. Sea temperatures.**—*C.E.P.B.*

3.1–122 551.553.11

Balkema, F., **An investigation on some aspects of the effect of land and sea breezes.** *Netherlands, (K.) Meteorologisch Instituut, Mededeelingen en Verhandelingen, Ser. B*, 2(13), **1950.** 50 p. 21 figs., 11 tables, 44 refs. **DWB**—After reviewing the literature on the characteristics and causes of land and sea breezes the author analyzes the phenomenon of land and sea breezes in Holland on the basis of observational data collected at Ijmuiden in the Dutch coast of the North Sea. The pressure field and temperatures of land and sea are analyzed and it is found that insolation is more important for the occurrence of sea breeze than the surface temperature difference between air over land and over sea. The theoretical studies of Bleeker, Haurwitz, Schmidt, etc. on the origin of sea breezes and the influence of atmospheric stability on the sea breeze are discussed. *Subject Headings:* **1. Land and sea breezes 2. Netherlands.**—*I.L.D.*

3.1–123 551.556.4

Bagnold, R. A., **Sand formations in southern Arabia.** *Geographical Journal*, London, 117, Pt. 1:78–85, March **1951.** 8 photos, maps (1 fold.), refs., append. **DLC**—The relationship between the shapes and orientations of sand dunes in the interior of Arabia and local wind regime, namely the strength and the direction of the winds, and the variation of both during

the year is discussed. A brief deductive description of the wind regime in the interior of Arabia is presented. The sand driving effect of the wind is represented by the formula $S=3.25\times10^{-3}\frac{N}{P}\left(\frac{v-V_t}{\log_{10}Z/k'}\right)^3$, where S=volume of sand in cubic meters per year which is driven past a fixed line one meter long in any direction; N=number of times in which wind is recorded as blowing in the given direction with speed v in miles per hour; P=number of regular observing times per day (no night recording); Z=height of measurements above open ground; k'=equivalent of 1 cm. (at this height above the sand the wind speed is always constant at 10 miles per hour); V_t=constant speed of 10 miles per hour. This formula is applied to calculate the sand driving effect at Hail and Riyadh and to explain the characteristics of the existing dune chains, downs, crescents, etc. A map of the location of these various sand dunes and photographs of them are presented. *Subject Headings:* **1. Wind effects 2. Sand dunes 3. Southern Arabia.**—*I.L.D.*

3.1–124 551.557

Sheppard, P. A., **Recent advances in science. Meteorology. The jet-stream and related phenomena.** *Science Progress*, 39(155):483–495, July **1951.** 4 figs., 13 refs. **DWB**—The jet stream is defined as a core of fast-moving air in slower air to north and south, above and below. Wind speed may reach 150 m./s. A cross section is shown from N. Norway to Spain. Shape and geographical distribution are described—forming in 70°N., moving S. and dying out in 35–20°N. The origin is not known, but it is related to temperature and wind shear: the critical anticyclonic shear is 10 m./s. per 100 km. It overlies the polar front and is associated with clear-air turbulence. Finally, some suggestions by Rossby as to dynamic cause are discussed. *Subject Headings:* **1. Jet stream 2. Upper air winds 3. Progress in meteorology 4. Meridional index.**—*C.E.P.B.*

3.1–125 551.558:551.511

Houghton, Henry G. and Cramer, Harrison E., **A theory of entrainment in convective currents.** *Journal of Meteorology*, 8(2):95–102, April **1951.** 8 figs., 9 refs., 22 equations. **MH-BH**—The purpose of this study is to present a theory of entrainment of air in accelerated vertical motion and not a theory of convection. The principle applies to accelerated downward motion as well as to upward motion. Temperature and vertical velocity of rising columns of dry and moist air with varying properties are shown diagramatically, integrated against height. Rates of entrainment and changes in moisture content are shown. *Subject Headings:* **1. Entrainment 2. Vertical motion 3. Convective currents.**—*M.R.*

3.1–126 551.558:551.577

Rao, Y. P. and Chelam, E. V., **Vertical velocity and rainfall by convergence due to latitude effect.** *Indian Journal of Meteorology and Geophysics*, 2(2):121–126, April **1951.** fig., 4 tables, 4 refs., 18 equations. **MH-BH**—The equations for computing the vertical velocity and rainfall, arising from convergence in northward motion without north-south velocity gradient, are derived and calculated values of the convergence effect at latitudes 10° to 35° latitude for a velocity of 30 knots are given. It is shown that the magnitude of convergence effect due to latitude is very small. *Subject Headings:* **1. Vertical velocity 2. Precipitation 3. Convergence.** —*I.L.D.*

CLOUDS AND CLOUD PHYSICS

(*See also items:* 3.1–59, 3.1–67, 3.1–68, 3.1–178, 3.1–182)

3.1–127 551.574.7:629.13

Bojdys, R., **Notes on de-icing trials.** *Meteorological Magazine*, London, 80(947):140–141, May **1951.** 5 photos. 2 refs. **MH-BH**—Photos illustrate ice accretion over North Sea, Trondheim and Arctic Circle, 4700–8000 ft., Feb. 27–28, 1950. *Subject Headings:* **1. Icing of aircraft 2. Aeronautical meteorology.**—*C.E.P.B.*

3.1–128 551.574.7:629.13

Harrison, Louis P., **Frost formation on aircraft in clear air. Part I: Meteorological conditions in the free air favoring frost formation. Part II: Description and quantitative data regarding frost formation at the surface.** U. S. Weather Bureau [1947]. 54+p. 4 figs., 6 tables. Typewritten. **DWB**—Five apparently authentic cases of frost formation on leading edges or wing surfaces of airplanes in flight (all in the Pacific Northwest or Alaska) and the attending meteorological conditions are cited. The physical processes for frost formation in air which is supersaturated with respect to ice, are thoroughly analyzed—most of the pertinent literature on the subject reviewed—and photographs of frost formations at the surface appended. *Subject Headings:* **1. Icing of aircraft 2. Supersaturation 3. Aeronautical meteorology.**—*M.R.*

3.1–129 551.576.1

Development of a cumulonimbus. *Meteorological Magazine*, London, 80(946):120, April **1951.** 4 photos. **DLC**—Photos from a height of 10,000 ft. 100 miles S.W. of Ireland show the development of a rather solitary cloud protruding through cumulus. *Subject Headings:* **1. Cloud formation 2. Cumulonimbus clouds.**

3.1–130 551.576:551.524.4

Neiburger, Morris, **Physical processes associated with summer stratus in California.** *International Union of Geodesy and Geophysics, Association of Meteorology, Transactions, Oslo 1948*, 2:134–136, **1950.** Mimeographed. **DWB**—The presence of the stratus is closely connected with existence of a strong and extensive inversion that characterizes the eastern and southern sides of the subtropical anticyclones. The stratus top coincides almost exactly with the inversion, the position and temperature of which are critical for the occurrence of stratus. The diurnal variations of inversion height, the importance of diurnal winds in producing diurnal variation of the inversion, the results of measurement of drop size, liquid water content and transmission and reflection of sun and sky radiation in the cloud are discussed. *Subject Headings:* **1. Stratus clouds 2. Inversions 3. California.**—*I.L.D.*

3.1–131 551.576.3

†Flach, E., **Zum täglichen und jährlichen Gang der Bewölkung.** [On the daily and annual variation of cloudiness.] *Zeitschrift für Meteorologie*, 5(7–8):212–224, July–Aug. **1951.** 4 figs., 4 tables, 25 refs. **MH-BH**—On the ground that radiation, etc. change little as cloud amount varies from 0 to 5, author devises a new classification with 9 divisions based on cloud amounts 0–5 (clear), 6–8 (cloudy) and 9–10 (overcast) at each of three hours of observation. These are grouped into anticyclonic summer, anticyclonic winter and cyclonic. Frequencies and annual variations of the different types at a number of stations are illustrated and their synoptic significance discussed. *Subject Headings:* **1. Cloud variations 2. Cloud classification.** —*C.E.P.B.*

3.1–132 551.576.4

Mondain, J., **Note sur les latitudes** (*sic*) **des bases et sommets des cumulonimbus tropicaux.** [On the altitude of the base and summit of tropical cumulonimbus clouds.] *La Météorologie*, 4th Ser., No. 21:26–31, Jan.–March **1951.** 25 figs. French, English and Spanish summaries p. 26. **MH-BH**—On the basis of 24 measurements of the height of the base and summit of cumulonimbus clouds carried out on photographs of clouds taken at Madagascar, the author concludes that a great many of the cumulonimbus clouds in the tropical Indian Ocean do not reach the zero isotherm. Moreover, there is no difference in precipitation between clouds which reach the zero isotherm and those that extend beyond it. Photographs of the clouds measured are given. *Subject Headings:* **1. Cloud height 2. Cumulonimbus clouds 3. Madagascar.**—*I.L.D.*

3.1–133 551.576

Muchnik, V. M., **O tochnosti vizual'nogo nabliudeniia vysoty oblakov, nakhodiashchikhsia v zenite.** [Accuracy of determination of the altitude of clouds at the zenith by visual method.] *Meteorologiia i Gidrologiia*, No. 3:64–65, **1947.** 2 tables, 2 refs. **DWB**—On the

basis of the current formula for determination of the accuracy of visual evaluation of the height of clouds, the author has computed the absolute value of errors in the evaluation of altitudes up to 1000 meters by an observer with an average eyesight. At 1000 m. the error is approximately 231 m. The age of the observer is a great factor in accommodation of the eye, varying from 10.0 (dioptrics) for age 20, down to 2.5 for age 50. *Subject Headings:* **1. Cloud height 2. Visual acuity.**—*C.K.*

PRECIPITATION

(*See also items:* 3.1–22, 3.1–25, 3.1–61, 3.1–77, 3.1–126, 3.1–144 to 3.1–146, 3.1–168)

3.1–134 551.577:551.506.3(46)

*Alvarez Castrillon y Bustelo, Manuel, **Antiguas observaciones pluviométricas en Barcelona.** [Earliest rainfall observations in Barcelona.] (*R.*), *Academia de Ciencias y Artes de Barcelona, Memorias*, 30(13):319–336, Nov. **1950.** tables, diagrs., equations. **DWB**—The earliest meteorological observations in Barcelona were temperature records kept between 1780 and 1824, 1825 and 1835–1839 by different observers. Precipitation records were begun in 1849 and continued until 1873 at one place and another series begun at the University of Barcelona in 1861 continued until 1946. Other records are analyzed statistically and compared with the above (Observatorio Fabra 1914–1946). Monthly, annual and running 3 year averages are plotted and given in tables for 97 years of record. *Subject Headings:* **1. Rainfall observations 2. Long period records 3. Barcelona, Spain.**—*M.R.*

3.1–135 551.577:551.508.77

Hoeck, E. and Thams, J. Chr., **Zum Problem der Niederschlagsmessung.** [On the problem of precipitation measurement.] *Geofisica Pura e Applicata*, 19(3–4):220–226, **1951.** 2 figs., 2 tables, 3 refs. In German, English, German and Spanish summaries p. 220. **MH-BH**—Comparative measurements were made during a 13 month period (May 1950 through May 1951) among 3 raingages, one flush with the ground, one protected (shielded) 1.5 m. and one unprotected at 1.5 m. The flush gage caught more than the unprotected gage 90% of the time, and more than the protected gage 78% of the time. These results are the more remarkable because of the light winds at the site (on the Magadino Plain) and are in agreement with similar studies on Schneekoppe made by KOSCHMIEDER (1934). The mean annual catch was 6% higher in the sunken gage and 4% higher in the protected than in the unprotected gage. *Subject Headings:* **1. Precipitation measurement 2. Rain gage exposure.**—*M.R.*

3.1–136 551.577:551.509.67

Langmuir, Irving, **Cause and effect versus probability in shower production.** *General Electric Research Laboratory, Project Cirrus, Occasional Report* No. 22, July 15, **1950.** 4 p. 3 equations. **DWB**—A brief report attempting to show that rainfall in New Mexico is not a result of cause and effect (which would mean that every shower could be forecast quantitatively) but of probability. This probability is increased by synoptic conditions, number of condensation nuclei, temperature, lapse rate, water vapor content, etc. The average rainfall and number of stations reporting on July 3 and 10, 1949 given as proof of theory. Several formulas are presented for calculating the probability as affected by sublimation nuclei concentration. *Subject Headings:* **1. Rainfall probability 2. Cloud seeding 3. Sublimation nuclei 4. New Mexico.**—*M.R.*

3.1–137 551.577:551.582.2(46)(469)

Spain. Servicio Meteorológico National, **Las series más largas de observaciones pluviométricas en la Península Ibérica.** [The longest series of rainfall records in the Iberian Peninsula.] *Spain, Servicio Meteorológico Nacional, Publicación, Ser. D.*, No. 1, **1943.** [143 p.] chiefly tables. **DWB**—A chart of Spain and Portugal shows the 30 odd stations which have the longest records several of 100 years or more. The earliest records date back to 1791 (Gibraltar) or 1803 (Madrid) and 1805 (San Fernando) and 1856 at Lisbon. Monthly and annual totals are given in tables and annual totals in histograms, for all of the available record in most cases from 1860 up to 1940 or 1942. Many of the earliest known records are lost. *Subject Headings:* **1. Precipitation data 2. Climatic data 3. Long period records 4. Spain 5. Portugal.**—*M.R.*

3.1–138 551.577:551.510.42

*Wiegel, H., **Niederschlagsverhältnisse und Luftverunreinigung des rheinisch-westfälischen Industriegebiets und seiner Umgebung.** [Conditions of precipitation and air pollution in the Rhine-Westphalia industrial area and its surroundings.] *Berlin, Universität, Meteorologisches Institut, Veröffentlichungen*, 3(3), **1938.** 52 p. 2 figs., 5 tables, 14 charts, 19 refs. **MH-BH**—Relation between rainfall and degree of pollution from smoke and dust in a highly industrial area is studied in detail from a historical, observational and statistical point of view. Charts, based on a very dense network of stations, show monthly precipitation distribution. *Subject Headings:* **1. Precipitation distribution 2. Atmospheric pollution 3. Rhine Region 4. Germany.**—*M.R.*

3.1–139 551.577.37

*Johns Hopkins University. Laboratory of Climatology, **The rainstorm of September 10–15, 1950 in southern New Jersey.** Seabrook, Johns Hopkins University, Laboratory of Climatology, Sept. 30, **1950.** 2 p. 3 charts, tables. Mimeographed. **DWB**—Over 12 inches of rain fell during this 4 day storm at Alloway, N. J., and over 10 inches at nearby stations. Details of the storm, including daily rainfall measurements at 62 stations and a station location and isohyetal chart of the region are included. Two hurricanes were reported well off the coast of the Middle Atlantic States during this period. *Subject Headings:* **1. Excessive rainfall 2. Floods 3. New Jersey.**—*M.R.*

3.1–140 551.578.11:551.508.7

Starý, Jaroslav, **Polarografické stanovení chloridů v deštové vodě.** [Polarographic determination of chlorides in rain water.] *Meteorologické Zprávy*, 4(3–4):78–80, **1950.** chart. **DWB**—Results of 13 determinations of chlorides in atmospheric precipitation are tabulated, along with average wind speed at 500 mb. and air mass trajectory. A chart, showing trajectories of air masses from north Atlantic source area, across the British Isles, Bay of Biscay, France, the North Sea, Mediterranean, Germany, Italy, etc. to Prague, where the measurements were made, is included. The greatest content was 2.42×10^{-4} in air that had crossed the Bay of Biscay, Mediterranean and Northern Adriatic (Dec. 10, 1949) and the least $.15\times10^{-4}$ in air that had come across Scotland and North Sea in February 1950. *Subject Headings:* **1. Rainwater analysis 2. Air trajectories 3. Prague, Czechoslovakia 4. Western Europe.**—*M.R.*

3.1–141 551.578.7

Brooks, Edward M., **A remarkable December hailstorm.** *Weatherwise*, 4(3):58–59, June **1951.** fig. **MH-BH**—The hailstorm which reached considerable depth occurred in St. Louis County, Missouri, on Dec. 2, 1950. The stones were star shaped. A full description of the synoptic conditions attending this storm is given. *Subject Headings:* **1. Hailstorms 2. Hail structure 3. St. Louis, Missouri.**—*I.L.D.*

HYDROMETEOROLOGY

3.1–142 551.579

Molnár, Ladislav, **Príspevok k ustáleniu prítokového súčiniteľa.** [An attempt to establish a coefficient of runoff.] *Meteorologické Zpravy*, 4(3–4):89–90, **1950.** 3 figs. In Slovak. **DWB**—Based on rainfall, runoff, evaporation data for 1936–44 (June and July) the coefficient of runoff for the Nove Zamsky-Sala Basin, where a reclamation project is under way, is developed. *Subject Headings:* **1. Hydrometeorology 2. Hydrologic cycle 3. Czechoslovakia.**—*M.R.*

3.1–143 551.579.4

*Carter, R. W., **Floods in Georgia, frequency and magnitude.** *U. S. Geological Survey, Circular* 100, March **1951.** 127 p. 52 figs., charts (in pocket), tables. **DWB**—Flood data, collected in Georgia since 1875 by various agencies, are compiled for various basins in Georgia and analyzed for determining maximum known flood and flood frequency. Map shows river basins, rivers and principal gaging stations. Records are tested for homogeneity. Numerous graphs show recurrence of annual floods of varying discharge for each river. Scatter diagram

shows relation of maximum known discharge to size of drainage area for mountain, piedmont and coastal plain locations. *Subject Headings:* **1. Flood frequencies 2. Flood intensity 3. Georgia, United States.**—*M.R.*

3.1–144 551.579.4:551.577.37

*Cross, William P., **Local floods in Ohio during 1948.** *Ohio, Water Resources Board, Bulletin* No. 18, July **1949.** 44 p. photos., charts, maps, diagrs., graphs, tables, biblio **DWB**—A summary of data collected on amount and intensity of rainfall and runoff during four record breaking floods which occurred in Ohio during 1948. Rainfall data compiled and discussed in this report are unusually complete. Location of rain gages shown on charts. *Subject Headings:* **1. Floods 2. Excessive rainfall 3. Ohio.**—*M.R.*

3.1–145 551.579.4:551.577.37

*Cross, William P. and Norquist, Kenneth S., **The flood of June 1946 in Wayne and Holmes Counties, Ohio.** *Ohio, Water Resources Board, Bulletin* No. 9, March **1947.** 44 p. photos., charts, maps, graphs, tables, 13 refs. Mimeographed. **DWB**—The synoptic weather situation which gave rise to the storms of June 12–13, and 16–17, 1946, are discussed by K. S. Norquist on p. 11–15. Other chapters include those on flood damage, records of precipitation and stream flow, rainfall—stream flow studies, and records of other floods in Ohio in 1946 and in other years. *Subject Headings:* **1. Floods 2. Excessive rainfall 3. Ohio.** *M.R.*

3.1–146 551.579.4:551.577.37

Learmonth, A. T. A., **The floods of 12th August, 1948, in southeast Scotland.** Liverpool University, Dept. of Geography [n.d.] 45+p. 20 figs., 19 refs. **DWB**—Detailed description of conditions during heavy rainstorms which produced extensive floods and damage in the Tyne and Eye basins. On Aug. 12, 1948 the rainfall amounted to 4 to 6 inches over a wide area and the total for the 6th to 12th was 6 to 10 inches. Many interesting charts and diagrams are included. (*See* note in *Scottish Geographical Magazine*, Dec. 1950.) *Subject Headings:* **1. Excessive rainfall 2. Floods 3. Scotland.**—*M.R.*

3.1–147 551.579.5 551.508.79

Köhn, M. and Person, H., **Über die Bestimmung der Bodenfeuchtigkeit auf elektrischem Wege. 2 Mitteilung.** [On the determination of soil moisture by electrical methods. Pt. 2.] *Baden, Landeswetterdienst, Jahresbericht mit Abhandlungen*, **1950.** p. 31–34. 4 figs., 2 refs. **DWB**—Describes further research towards determining soil moisture by: 1) DK method (capacity bridge); 2) a new electrode of fine copper wire on a gypsum block; 3) conductivity measurer; 4) field researches and 5) effect of temperature in increasing conductivity of solutions by 2% per degree. *Subject Headings:* **1. Soil moisture measurement 2. Soil moisture instruments.**—*C.E.P.B.*

CLIMATOLOGY AND BIOCLIMATOLOGY

CLIMATOLOGY OF PARTICULAR PLACES

(*See also items:* 3.1–89, 3.1–108, 3.1–137)

3.1–148 551.582(624)

*Ireland, A. W., **The climate of the Sudan,** (In: **Agriculture in the Sudan.** J. D. Tothill (*ed.*). London, Oxford University Press, **1948.** p. 62–83. 8 figs., 11 tables.) **DA**—The general circulation over the Sudan and its basic climatic pattern are described. The Sudan is divided into three climatic regions: 1) north of latitude 19°N., 2) south of latitude 17°N. and 3) the Red Sea coast and the eastern slopes of the Red Sea Hills. The climate of each region is described. Maps of annual rainfall, mean annual rainfall distribution, mean annual rainfall variability and of mean annual temperature to 1940; list of meteorological stations, tables of mean maximum daily temperature, highest maximum temperature, mean daily minimum temperature, lowest minimum daily temperature, mean daily range of temperature, mean daily temperature and mean relative humidity of 0800 and 1400 hours are given. *Subject Headings:* **1. Climatology 2. Observational data 3. Sudan I. Tothill, J. D.** (*ed.*).—*I.L.D.*

3.1–149 551.582:69

Legget, R. F., **Climate and building.** *Royal Meteorological Society, Canadian Branch* [*Publications*], 1(8), Nov. **1950.** 15 leaves. 2 photos, 9 refs. Mimeographed. **DWB**—After summarizing research in other countries, author refers to work in Canada mostly on problems peculiar to that country—construction in winter, including ice pressure and properties of snow, National Building Code, design in relation to local conditions such as heat flow in ground, weathering and heat and vapor loss. The use of test huts is described. *Subject Headings:* **1. Climatology 2. Building construction 3. Canada.**—*C.E.P.B.*

3.1–150 551.582(771)

*§Sanderson, Earl E., **The climatic factors of Ohio's water resources; precipitation, temperature, evaporation, trends and cycles, excessive rainfall.** *Ohio, Dept. of Natural Resources, Div. of Water, Bulletin* 15, May **1950.** pagination varies. charts, graphs, tables, refs., append. **DWB**—A voluminous compilation of all of the available weather data for the State of Ohio, of interest to hydrologists. After general discussion of hydrology, water management, the climate of Ohio, physiography, sources of data, reliability of records, etc. the major part of the work consists of discussion, charts and tables of rain, snow temperature, evaporation (6 stations), excessive precipitation, frost, wind movement, droughts, wet periods, etc. The index of records, by counties, is most comprehensive, being presented in graphic-tabular form. *Subject Headings:* **1. Climatology 2. Water resources 3. Ohio.**—*M.R.*

3.1–151 551.582.1(62)

Simon, A., **Brève étude climatologique de l'année 1950 en Égypte.** [Brief climatological study of the year 1950 in Egypt.] *La Météorologie*, 4th Ser., No. 21:55–56, Jan.–March **1951.** French, English and Spanish summaries p. 55. **MH-BH** The winter was cold but the rainfall was only slightly above the normal; in lower Egypt a temperature of −4°C. was recorded. The spring was marked by storms, hail and heat wave. The summer was very hot and humid. A temperature of 45°C. was reached. The fall was characterized by mild weather. At Cairo sand storms were absent and fog was rare. *Subject Headings:* **1. Climatology 2. Egypt.**—*I.L.D.*

3.1–152 551.582.2(44)

Rougetet, E. and Bourgeois, M., **Indices de micro-climat à Toulon.** [Microclimatic indexes at Toulon.] *La Météorologie*, 4th Ser., No. 21:49–54, Jan–March **1951.** figs., tables. French, English and Spanish summaries p. 49. **MH-BH**—The meteorological stations Mitre and Mourillon at Toulon are 10 miles apart and the difference in altitude is about 100 ft. A two year record of monthly mean maxima and minima of air temperature, relative humidity, precipitation and vapor pressure for the two stations is presented and the range of the meteorological elements between the two localities is compared. *Subject Headings:* **1. Climatology 2. Weather comparisons 3. Toulon, France.**—*M.R.*

3.1–153 551.582.2(46)

*Schmitt, Richard, **El clima de Castilla la Vieja y Aragon.** [The climate of Old Castile and Aragon.] [Zaragoza], Institución Fernando el Católico, Sección de Geografía, **1946.** Price 12 pesetas. 89 p. fold. maps, biblio. Translation of his "Das Klima von Altkastilien und Aragonien." **DLC**—A major compilation of the basic climatic data for this region of Spain and an analysis of the data (1906–1925) by elements (temperature, precipitation, relative humidity, cloudiness and hydrometeors) by months or seasons and by regions (Old Castile, Aragon and the marginal provinces). Large isoline charts of temperature and rainfall and charts showing climatic provinces are included. *Subject Headings:* **1. Climatology 2. Translations 3. Old Castile 4. Aragon, Spain.**—*M.R.*

3.1–154 551.582.2:551.506.1(493)

*Vandenplas, A., **Le temps en Belgique pendant l'année 1950.** [The weather in Belgium during 1950.] *Ciel et Terre*, 67(3–4):42–50, March–April **1951.** 5 tables. **DLC**—Frequency of winds from 16 directions during 1950 compared to normal, by seasons, thunderstorms, temperature, sunshine, relative humidity, fog, evaporation, precipitation, etc. for Belgium

discussed and illustrated by small tables of mean values or frequencies. *Subject Headings:* **1. Climatic data 2. Belgium.**—*M.R.*

CLIMATIC CHANGES

3.1–155 551.583.1(481)

Hesselberg, Th., **The recent variations of the climate of Norway.** *International Union of Geodesy and Geophysics, Association of Meteorology, Transactions, Oslo 1948*, 2:96–102. **1950.** Mimeographed. **DWB**—Variations in the climate of Norway were investigated by an analysis of thirty year means of the climatic variables (1861–1890, 1863–1892 . . .). The variations of wind direction and velocity, air temperature, relative humidity and precipitation are described. The general atmospheric circulation over northwestern Europe has increased during the last 60–70 years so that the southern airstream has intensified over Norway. With increasing southerly wind, air temperature and relative humidity have risen and precipitation has increased. The increase in the general circulation is attributed to increase in energy received from the sun. *Subject Headings:* **1. Climatology 2. Long period records 3. Climatic variations 4. Norway.**—*I.L.D.*

3.1–156 551.583.2:634.9(45)

†Buli, Ugo, **Ricerche climatiche sulle Pinete di Ravenna.** [Climatic investigation on the Pinete di Ravenna.] *Italy, Centro di Studi per la Geografia Fisica. II—Ricerche sulle Variazioni Storiche del Clima Italiano*, No. 10. **1949.** 77 p. 27 figs., 106 refs. **DWB**—A comprehensive study of the dendrochronology of the pine trees found in the pine woods along the shore at Ravenna, Italy, in relation to temperature and precipitation, accidental causes and climatic changes. Records dating back to 1737 are analyzed for periodicities, especially in relation to the sunspot cycle. Comparison is made with other analyses in Europe and America. *Subject Headings:* **1. Dendrochronology 2. Climatic variations 3. Ravenna, Italy.** —*M.R.*

3.1–157 551.583.2:551.311.12

Martin, Ed., **Recul des glaciers et variation climatique.** [Recession of glaciers and climatic variation.] Paris, Société Hydrotechnique de France, **1950.** 4 p. Mimeographed. **DWB**—The author presents the hypothesis that the recession of glaciers is due to a seasonal change of the movement of tropical waters (Gulf Stream) towards the North Atlantic. *Subject Headings:* **1. Climatic variations 2. Glaciers.**—*I.L.D.*

3.1–158 551.583.3:551.513.523.2

Willett, Hurd C., **The general circulation at the last (Würm) glacial maximum.** *Geografiska Annaler*, 32(3–4):179–187, **1950.** fig., refs. **MH-BH**—There are two schools of thought among the solar variability school as to the cause of glacial-interglacial periods. One school maintains that lower solar radiation causes the glaciation, the other that increased radiation is the cause. The mechanisms, which might produce glaciation during periods of increased solar constant, are discussed. A chart shows possible mean circulation pattern for Northern Hemisphere during the last ice age, as reconstructed by WILLETT, who holds that an increase in solar constant or solar activity would increase temperature in lower latitudes more than in high latitudes, increase the gradient and polar heat transport and thus the general circulation and cause more precipitation and cold in the sub-Arctic. *Subject Headings:* **1. Climatic changes 2. General circulation 3. Glacial periods 4. Solar activity.**—*M.R.*

MICROCLIMATOLOGY

(*See also item:* 3.1–180)

3.1–159 551.584.3 551.524.3

Busse, W., **Temperaturmessfahrten.** [Temperature observation trips.] *Baden, Landeswetterdienst, Jahresbericht mit Abhandlungen*, **1950.** p. 12–15. 5 figs., 3 refs. **DWB**—A report on atmospheric temperatures encountered during motorcycle trips up and down an alpine valley above St. Blasien. The trips were made up to a height of 935 m. between 13:40

and 15:20 o'clock on Sept. 1948. The temperature was measured with a thermograph held 70 cm. above the ground and 40 cm. from the observer. The variations of temperature with elevation, with exposure of slope and with topography, and the effect of forest and clearings upon temperature are discussed. *Subject Headings:* **1. Microclimatology 2. Temperature variations 3. Forest influences 4. Black Forest, Germany.**—*I.L.D.*

3.1–160 551.584.4:633.61

Gadre, K. M., **Micro-climatic survey of a sugarcane field.** *Indian Journal of Meteorology and Geophysics*, 2(2):142–150, April **1951.** 6 figs., 5 refs. **MH-BH** –Dry and wet bulb temperatures were recorded in a sugarcane field during varying stages of growth at the maximum temperature period and at elevations that ranged from the ground surface to 6 ft. above the ground. The gradual changes in dry bulb temperature and vapor pressure are shown graphically. Microclimatic differences between the "open" and the crop begin when the crop reaches a height of 2 to 3 ft. above the ground. Within a distance of three rows width from the border the climate of the matured sugarcane crop is fairly homogeneous. In the mature crop a secondary active surface is formed at 12 ft. above the ground and produces an inversion within the crop. *Subject Headings:* **1. Microclimatology 2. Sugarcane.** –*I.L.D.*

3.1–161 551.584.61:697

Chernin, L. B., **K voprosu sanitarnogo normirovaniia mikroklimata zhilykh i drugikh grazhdanskikh zdanii massovogo stroitel'stva.** [The hygienic control of the microclimate of dwellings and of other large civilian buildings.] *Gigiena i Sanitariia*, No. 2:14–15, Feb. **1951.** 4 figs. **DLC**—The author discusses the problem of heating rooms so that the temperature be evenly distributed within a height of about six feet from the floor. The change of air temperature with a height of 15 feet above the floors in rooms heated by various means is shown graphically. Radiant heating of floors results in a uniform temperature. Depending upon type of stone, the difference in temperature between floor and ceiling may be as much as 9°C. and between floor and 10 feet above floor as much as 4°C. (14.5° and 18.5°C., respectively). Recommendations for suitable heating of rooms, depending upon their use by children or adults, etc. so as to achieve a maximum comfort and healthfulness are presented. *Subject Headings:* **1. Microclimatology 2. Heating and ventilating.**—*I.L.D.*

3.1–162 551.584.61

Saito, H., **On the indoor climate.** *Journal of Meteorological Research*, Tokyo, 2(13):397–425, Feb. **1951.** 33 figs., 2 tables, 7 refs., 4 equations. In Japanese, English summary p. (13). **DWB** Author discusses and evaluates the cooling rates and the difference between outdoor temperature and humidity and those at various heights in several rooms, without and with internal heating (stove). The results are shown in graphs with legends in English. Relative humidity depends on indoor temperature and added moisture. The air circulation shows ascent at 150 cm./sec. near stove, descent at 30 cm./sec. near walls and flow towards stove 15 cm. above floor. *Subject Heading:* **1. Indoor climates.**—*C.E.P.B.*

BIOCLIMATOLOGY—APPLIED CLIMATOLOGY

(*See also item:* 3.1–106, 3.1–107)

3.1–163 551.586:615.8

Trefná, E., **Význam místního podnebí pri plánování klimatických míst.** [The importance of local climate in the planning of health resorts.] *Meteorologické Zprávy*, 4(3–4):86–87, **1950.** In Czech. **DWB**—A short promotional type of article on medical climatology, especially as it relates to selection of health resorts. *Subject Headings:* **1. Medical climatology 2. Health resorts.**—*M.R.*

3.1–164 551.586:616:551.510.42

Bloomfield, J. J., **Health implications of air pollution.** *American Society of Civil Engineers, Proceedings*, 77, *Separate* No. 73, June **1951.** 7 p. **DWB**—A general discussion of history of effort to combat air pollution and of the effects of major and minor incidents of contamination on health. *Subject Headings:* **1. Medical climatology 2. Atmospheric pollution.** –*M.R.*

3.1–165 551.586:616

Unger, Max, **Hay fever, humidity, and sinusitis.** *New York State Journal of Medicine*, 50(14):1727–1730, July 15, 1950. 2 figs., 2 tables, 5 refs. Reprint available. **DWB**—Hay fever is considered to be an acute aggravation of a chronic nasosinusitis that is brought about by a high atmospheric humidity. Accumulation of moisture in the nasal mucous because of inadequate evaporation into humid air accounts for the sinusitis. Hay fever is preceded by a chronic sinus infection. Two case histories are cited. *Subject Headings:* **1. Medical climatology 2. Humidity 3. Hay fever 4. Sinusitis.**—*I.L.D.*

3.1–166 551.586:616

Wagner, Heinrich, **Einfluss föhnartiger Verhältnisse auf den Komplementgehalt bei Rheumatikern.** [Influence of föhn-like conditions on the complement-content (i.e., bacteria-destroying substance) in rheumatics.] *Angewandte Meteorologie*, 1(1):19–23, **1951.** 2 figs., 3 refs. **MH-BH**—Analyses of complement in blood serum (as an index of resistance) were made on rheumatic patients at Bad Elster. These were compared with a "föhn value" equal to the interdiurnal change of temperature at 1 km. minus $\frac{1}{2}$(2+3 km.), which has a definite relation to weather. Positive values were associated with large or small complement content, negative values with average content. From variation on successive days author infers that föhn-like weather causes a stimulus which first increases complement, followed by a reversal. *Subject Headings:* **1. Medical meteorology 2. Rheumatism.**—*C.E.P.B.*

3.1–167 551.586:631

Foster, Walter D., **A study of weather factors affecting cotton yields.** North Carolina State College of Agriculture and Engineering [March 31, **1948**]. 10+p. tables, refs. **DWB**—An attempt is made to combine crop weather data in such a way as to make it possible to apply statistical tests to the complex problem of how weather affects cotton yields. Temperature, precipitation, soil moisture, evaporation, variety of cotton, fertilizer treatment, planting dates, etc. were considered. Yields during 1939–41 for 4 plots with 2 planting dates and 2 levels of fertilization in South Carolina, Georgia, Mississippi, Arkansas and Oklahoma were used. Sufficient variations in weather condition were found to warrant further study. A punch card code was devised for recording weather data for future studies of this type. *Subject Headings:* **1. Meteorological elements 2. Crop yields 3. Cotton 4. Statitiscal analysis 5. Punched card analysis.**—*M.R*

3.1–168 551.586:633.3:551.578.46

Klimenko, G. A. and Kozlova, Z. M., **Termicheskiĭ rezhim zimovki klevera i liutserny v raĭonakh neustoĭchivogo snegovogo pokrova Primor'ia.** [Thermal regime of the wintering of clover and lucerne in the regions of unstable snow cover in Primor'e.] *Akademiia Nauk SSSR, Dal'nevostochnaia gornotaezhnaia stantsiia, Trudy*, Khabarovsk, 5:201–216, **1946.** 6 tables, 5 refs. **DLC**—Meteorological characteristics of the winters 1939–1940 and 1940–1941 are given, data of the minimum temperatures on the soil surface and at depths of 5, 10 and 20 cm. with snow cover and without it are presented. The climatic conditions injurious to clover are determined. The most suitable sorts of clover and lucerne for this area are pointed out. *Subject Headings:* **1. Wintering of crops 2. Forage crops 3. Snow cover 4. Agricultural meteorology 5. Primor'e, Siberia 6. U.S.S.R.**—*N.T.S.*

3.1–169 551.586:63

*Samoĭlov, T. P., **Opyt razvedeniia plodovo-iagodnykh kul'tur na gornykh sklonakh Primor'ia.** [An experiment on cultivation of fruits and berries on the mountain slopes of Primor'e.] *Akademiia Nauk, SSSR, Dal'nevostochnaia gornotaezhnaia stantsiia, Trudy*, Khabarovsk, 5:55–130, **1946.** 30 tables, 44 refs. **DLC**—A detailed report of the experimental work of the station on the study of physico-geographical conditions of the Primor'e and the selection of fruits and berries which could be cultivated in this area. The characteristics of the soil-climatic types and their importance for the development of cultivation of fruits and berries are given on p. 58–83. Consolidated tables of observations of temperature, precipitation, snow cover and biological-phenological observations of 34 sorts of cultivated

plants are given. Attention is paid to the problem of the influence by relief and aspect of the slope. *Subject Headings:* **1. Agricultural meteorology 2. Phenology 3. Primor'e, Siberia 4. U.S.S.R.**—*N.T.S.*

MISCELLANEOUS APPLICATIONS

COSMIC INFLUENCES

(*See also item:* 3.1–71)

3.1–170 551.590.21

†Flohn, Hermann, **Solare Vorgänge im Wettergeschehen.** [Solar processes in weather phenomena.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 3(3–4):303–329, **1951.** 6 figs., 72 refs. German, English and French summaries p. 303–304. **MH-BH**—A summary of relations between various weather elements and the 11-year sunspot cycle leads to the general conclusion that high solar activity is accompanied by weakened zonal and strengthened meridional circulation in high latitudes. The 5.6-year and 27-day cycles are also discussed. Author then examines connection between meridional passage of sunspots and daily thunderstorm frequency in Germany and finds increased frequency on following 3 days (rather indefinite). There is some agreement between daily thunderstorms and magnetic disturbance. Relations are discussed between pressure anomalies and 24-hour changes in Europe and magnetic disturbance in different phases of sunspot cycle. The meaning of these relations is discussed—UV or corpuscular radiation from solar eruptions—with various theories of the mechanism. *Subject Headings:* **1. Solar phenomena 2. Sunspot cycles 3. Germany 4. Europe.**—*C.E.P.B.*

3.1–171 551.590.21:551.510.535

Napoletano, Aldo, **Ricerche di correlazioni ionosferico-meteorologiche.** [Research on ionospheric-meteorological correlations.] *Rivista di Meteorologia Aeronautica*, 10(3):18–22, July–Sept. **1950.** 3 figs. Italian, French, English and German summaries p. 18. **MH-BH**—A survey of research on correlation between ionospheric and meteorological conditions since 1932 is followed by a series of graphs, showing relation between mean pressure and hours of maximum ionization of the F2 layer (according to MIHRAN) and of E layer variations and Wolf number as obtained at the Central Radiopropagation and Radionavigation Laboratory in Naples. Research now in progress there is outlined. *Subject Headings:* **1. Ionospheric variations 2. Solar influences 3. Ionospheric research laboratories 4. Naples, Italy.**—*M.R.*

3.1–172 551.590.22:550.384.4

Rougerie, Paul, **Variation diurne lunaire de la déclinaison magnétique et de la composante verticale du champ terrestre au Val-Joyeux.** [Lunar diurnal variation of magnetic declination and the vertical component of the terrestrial field at Val-Joyeux.] *Annales de Géophysique*, 6(4):300–308, Oct.–Dec. **1950.** 4 figs., tables, 5 refs. French and English summaries p. 300. **DBS**—Lunar diurnal variations of D and Z at Val-Joyeux have been calculated for 25 years according to the method developed by S. CHAPMAN. Tables showing the seasonal variations of the declination and of the vertical component are given. A "phase law" was established for the declination. *Subject Headings:* **1. Lunar diurnal variations 2. Magnetic declinations 3. Val-Joyeux, France.**—*I.L.D.*

OPTICAL PHENOMENA

3.1–173 551.591.3:551.510.42

†Goldman, Louis, **A study of the relation between smoke pollution and visibility.** Thesis (M.S.)—New York University, May 6, **1948.** 44 p. 18 figs., 14 tables, 11 refs., 34 equations. **DWB**—Visibility data for Boston airport are analyzed to determine the effect of wind direction, speed, day of week, relative humidity, sky cover, air mass, visibility (from Blue Hill records), etc. on visibility at Boston airport. Detailed graphs and tables are presented, showing the relationships—if any—of these variables to each other. It was found that wind direction and speed, and day of week are the most important factors. Formulas are developed from the scatter diagrams for these variables. It is suggested that visibility be reported in each direction

rather than as an average of all directions, since the variation with direction of sight is greater than that due to all other factors. A comparison is made with data for New York City and the theory of turbulent diffusion of smoke and gases applied to study of the problem. *Subject Headings:* **1. Atmospheric pollution 2. Smoke 3. Visibility 4. Boston, Massachusetts.**—*M.R.*

3.1–174 551.593.62

Simmons, R. E. G., **Rainbow effects, North Atlantic Ocean.** *Marine Observer*, 21(152):82–83, April **1951.** 2 figs. **DWB**—Detailed sequence of observations of brilliant primary and secondary bows in approaching rainstorm. *Subject Headings:* **1. Rainbows 2. North Atlantic Ocean.**—*C.E.P.B.*

3.1–175 551.593.63

Dieterichs, Heinz, **Das Halophänomen in Nyköping am 3. Okt. 1580.** [Halo phenomenon in Nyköpking on Oct. 3, 1580.] *Tellus*, 3(2):113–114, May **1951.** fig., 2 refs. **MH-BH**—A brief account of the sketch of a complicated halo phenomenon which was found in a manuscript in the archives at Göttingen. The rings and sundogs, which were observed by many people (unnamed) at "Nienköppen in Schweden" on Oct. 3, 1580 are vividly if not too accurately depicted. Other early halo observations are mentioned. *Subject Headings:* **1. Halo observation 2. Sweden.**—*M.R.*

3.1–176 551.593.63

Smith, Thomas, **Optical cusp.** *Weather*, 6(6):186, June **1951.** fig. **DWB** Inverted cusp seen in Ci. St. above sun at 8h.40m. Jan. 16. (Most probably upper tangent arc of 22° halo.) *Subject Heading:* **1. Halos.**

3.1–177 551.593.653:551.594.5

Paton, James, **Simultaneous occurrence of aurora and luminous night clouds.** *Meteorological Magazine*, London, 8(947):145, May **1951.** 3 photos, 2 refs. **MH-BH** Noctilucent clouds and a diffuse auroral arc were observed from central Scotland, July 24–25, 1950. No radar response was obtained. *Subject Headings:* **1. Auroras 2. Noctilucent clouds 3. Scotland.**—*C.E.P.B.*

ELECTRICAL PHENOMENA

(*See also items:* 3.1–30, 3.1–177)

3.1–178 551.594:551.574.7

Meinhold, Heinz, **Die elektrische Ladung eines Flugzeuges bei Vereisung in Quellwolken** [The electrical charge on an airplane during icing in cumulus clouds.] *Geofisica Pura e Applicata*, 19(3–4):176–178, **1951.** fig., 5 refs. In German, English, French and German summaries p. 176. **MH-BH** On a flight through a thundercloud >8000 ft. the electric charge on the surface of the plane was measured with a rotating static voltmeter. Results of these measurements (made at Danzig on Sept. 11, 1944) are shown graphically. During icing a heavy negative charge occurred on the plane, a maximum of −35 KV being limited by a brush discharge after de-icing. A slight charge of the opposite sign remained. Results disagree with those of FINDEISEN, but agree with WORKMAN (*see item* No. 7–127 in July 1950 *Meteorological Abstracts*) and KRAMER (*item* No. 5–115 in May 1950 *Meteorological Abstracts*) *Subject Headings:* **1. Electric charges 2. Icing of aircraft 3. Cloud physics.**—*M.R.*

3.1–179 551.594:6

Schroeder, Gert, **Mediciones de la electricidad atmosférica de la Mision Científica Alemana en la Universidad Mayor de San Andres—La Paz Bolivia.** [Measurements of atmospheric electricity by the German Scientific Mission at the Universidad Mayor de San Andres, La Paz, Bolivia.] *Nimbus*, 2(6–7):56–58, April–Sept. **1950. MH-BH**—Brief note on the measurement of atmospheric potential gradient and ionization or charge and especially that done at the high altitude of San Andres University (3632 m.). The purpose of such measurements and studies is to determine the effect of atmospheric charges on the health o

pilots or other human beings at high altitudes. *Subject Headings:* **1. Atmospheric electricity 2. Aviation medicine 3. La Paz, Bolivia I. La Paz. Universidad Mayor de San Andres, Mision Científica Alemana.**—*M.R.*

3.1–180 551.594:551.584

*Vidal Llenas, José M., **Conductibilidad eléctrica del aire.** [Electrical conductivity of air.] *Spain, Servicio Meteorológico Nacional, Publicación, Ser. A*, No. 17, **1945.** 79 p. 33 figs., tables, 28 refs., 6 equations. **DWB**—An important monograph on various methods used in Spain for determining the conductivity of air in the laboratory and in nature. Measurements of capacity, condensation nuclei, ionization, etc. were made and data given showing a comparison between the center and the outskirts of Barcelona and conditions in Madrid. The effects of visibility, wind, speed, relative humidity, temperature, pressure, pressure change, cloudiness and wind direction are also discussed and tabulated. Many graphs show the relationships clearly. Hourly and seasonal variations of some of the elements also shown for periods from 1936–1944. *Subject Headings:* **1. Electrical conductivity 2. Condensation nuclei 3. Ionization 4. Urban influences 5. Barcelona 6. Madrid I. Spain. Servicio Meteorológico Nacional.**—*M.R.*

3.1–181 551.594.1

Hess, Victor F. and Vancour, Roger P., **The ionization balance of the atmosphere.** *Journal of Atmospheric and Terrestrial Physics*, 1(1):13–25, **1950.** 4 figs., 5 tables, 12 refs., 6 equations. **MH-BH**—Authors examined, by new methods at Fordham, ionization *I* (pairs of ions produced in 1 cc. air per sec.) due to hard (filtered through 10 cm. iron) and soft cosmic radiation and to radioactive material in air and ground. At 1 m. results gave:

Cosmic rays	hard 1.51 I	Beta rays	0.40 I
	soft 0.27 I	Gamma rays	air 0.15 I
Alpha rays	1.76 I		ground 3.0 I

From the total, 7.2 *I*, law of recombination and average life of small ions (observed, same site, 10.6 sec.) number of small ions in equilibrium is 70–80 per cc. Site is near a large city, average nuclei 40,000 per cc. *Subject Headings:* **1. Ionization 2. Radioactivity in the atmosphere.**—*C.E.P.B.*

3.1–182 551.594.14:551.574.1

Garrigue, Hubert, **L'invasion d'air radioactif d'origine atomique et son influence sur les précipitations atmosphériques.** [Invasion of radioactive air of atomic origin and its effect upon atmospheric precipitation.] *Académie des Sciences, Paris, Comptes Rendus*, 232(10): 1003–1004, March 5, **1951.** **DWB**—On Jan. 13, 1951 and Feb. 3, 1951 a radioactive complex "A," observed first after the Bikini atomic explosion, was detected anew in France. The radioactive cloud observed may be of direct atomic origin or from products of the explosion. After the explosion a large part of the radioactive cloud extends into the stratosphere, a part forms condensation nuclei. It is concluded that atomic explosions will contaminate the air over limited areas. *Subject Headings:* **1. Radioactivity in the atmosphere 2. Condensation nuclei 3. Atomic explosions 4. Bikini 5. France.**—*I.L.D.*

3.1–183 551.594.21

Bravo, F. Martín, **Corrientes eléctricas verticales originadas por la acción de las puntas bajo nubes tormentesas, lluvia, etc.** [Vertical electric currents caused by the action of the lower portions of thunderclouds, rain, etc.] *Spain, Servicio Meteorológico National, Publicación, Ser. A*, No. 15, **1943.** 15 p. figs., 5 refs. **DWB**—Investigations conducted at the University of Seville (1934–1936) on the electrical fields underneath thunderclouds and the effects of rain, currents, etc. on the amount and polarity of the charges, given in text and graphically. An attempt is made to explain the tendency of charge on earth and in the lower part of the cloud and the direction of the electrical currents. Diurnal and seasonal variations noted. Theoretical work follows that of C. T. R. Wilson. *Subject Headings:* **1. Thunderstorm electricity 2. Seville, Spain. I. Spain. Servicio Meteorológico Nacional.**—*M.R.*

3.1–184 551.594.22

Kumm, Alfred and Wolf, Franz, **Ladungen aus Reifschichten und ihr Anteil an der Gewitterelektrizität.** [Charges from rime layers and their part in thunderstorm electricity.] *Naturwissenschaften*, 38(13):301, July 1–15, 1951. **MH-BH**—A preliminary account of a laboratory research. Rime was formed on the lower surface of a cooled metal hemisphere. With rapid changes of temperature ice dendrites about 0.02 mm. long split off. Their charge averaged 7×10^{-16} coulombs, maximum 2.5×10^{-14}. Number of positive charges about 7 times number of negative. This splitting process cannot account for electricity of thunderstorms. *Subject Headings:* **1. Electrical discharges 2. Rime formation.**—*C.E.P.B.*

PART II. A SELECTIVE ANNOTATED BIBLIOGRAPHY ON CLIMATOLOGY OF NORTHWEST AFRICA

By: *Harris P. Kramer*

EXPLANATORY NOTE

The region covered by this bibliography comprises the northwest section of Africa, north of French West Africa and west of Egypt, including the neighboring Canary and Madeira Islands and surrounding seas. The various countries appear alphabetically in the Outline of Contents below.

No attempt has been made to compile an exhaustive list of references on the climate of this large area. However, many unusual sources have been searched, and further research may be done by consulting bibliographic sources designated by a dagger (†).

All material on French West and Equatorial Africa and the Guinea Coast region has been reserved for a future bibliography on Central Africa (including the Cameroons and the Belgian Congo).

The asterisk (*) designates a good source of climatological or observational data.

OUTLINE OF CONTENTS

Northwest Africa (in general, including bordering seas)
- Climatology, 3A–34, –87, –120, –136, –211, –223, –230, –232, –241 to –243, –246, –248, –258, –273
  - Aeronautical climatology, 3A–57, –230, –241, –242, –245
  - Bioclimatology, 3A–230
  - Climatic changes, 3A–41, –60, –67, –301
  - Climatic data, 3A–6, –52
  - Dynamic climatology, 3A–201
- Synoptic studies and forecasting, 3A–87, –93, –120, –136, –177, –211, –232, –246, –292
- Atmospheric pollution, 3A–154
- Dust, 3A–154, –198
- Atmospheric circulation, 3A–52, –177, –185, –201
- Air masses and fronts, 3A–87, –136, –211
- Thunderstorms and squalls, 3A–178
  - Thunderstorm distribution, 3A–164
- Solar radiation, 3A–264, –280
- Sea temperatures, 3A–202
- Pressure distribution, 3A–52
- Pressure changes, 3A–178
- Pressure variations, 3A–177
- Winds, 3A–185
  - Dust storms, 3A–280
  - Harmattan, 3A–154
  - Sandstorms, 3A–198
  - Trade winds, 3A–177
  - Turbulent exchange, 3A–280
  - Upper air winds, 3A–130, –135
    - Upper air wind data, 3A–130
- Precipitation, 3A–34, –258
  - Artificial precipitation, 3A–114
- Visibility, 3A–179

Algeria
- Bibliographies, 3A–260, –296
- Meteorological services, 3A–118, –151
- Meteorological observatories, 3A–169, –186, –195, –226
- Climatology, 3A–2, –4, –17 to –19, –38, –76, –92, –118, –120, –141, –160, –174, –212, –223, –234, –238, –241, –250, –251, –260, –273, –288, –296
  - Aeronautical climatology, 3A–111, –241
  - Agricultural climatology, 3A–25
  - Climatic classification, 3A–254
  - Dynamic climatology, 3A–212
  - Medical Meteorology, 3A–161
- Observational and climatic data, 3A–9 to –11, –21, –23, –39, –92, –141, –173, –192, –235, –250, –294, –295
- Upper air observation, 3A–169
  - Upper air data, 3A–173
- Synoptic study and forecasting, 3A–97, –270, –274
  - Synoptic charts, 3A–192
- Atmospheric circulation, 3A–208, –254
- Dust, 3A–226
- Formations and disturbances, 3A–270
- Solar radiation, 3A–186, –226
- Temperature, 3A–133
  - Frost, 3A–213
  - Nocturnal cooling, 3A–25
- Diurnal pressure variations, 3A–180
- Winds, 3A–267
  - Sandstorms, 3A–182, –227, –233, –270
  - Sirocco, 3A–213
  - Upper air winds, 3A–112
- Humidity, 3A–237
- Evaporation, 3A–3, –288

Cloudiness, 3A–208
Precipitation, 3A–3, –10, –18, –26, –27, –35, –182, –208, –219, –220, –239, –253, –279, –290
Hail, 3A–7
Floods, 3A–219
Mud rains, 3A–183
Precipitation intensities, 3A–165
Hydrology, 3A–279
Visibility, 3A–231
Turbidity, 3A–186, –226

Canary Islands (and surrounding seas)
Climatology, 3A–8, –36, –121, –230, –241, –248
Aeronautical climatology, 3A–230, –241, –275
Bioclimatology, 3A–230
Observational and climatic data, 3A–6, –155, –261
Atmospheric circulation, 3A–176, –215
Atmospheric pressure, 3A–266
Winds
Trade winds, 3A–215
Upper air winds, 3A–176, –282

Libya (including Cyrenaica and Tripolitania)
Bibliographies, 3A–132
Climatology, 3A–20, –28, –37, –42, –44, –49, –53, –54, –58, –59, –63 to –65, –68, –69, –72 to –74, –77, –80, –81, –108, –117, –122, –131, –132, –142, –150, –170, –184, –199, –210, –241
Aeronautical climatology, 3A–241, –284, –289, –291
Agricultural climatology, 3A–104, –115, –124, –187
Climatic changes, 3A–50, –100, –125
Climatic regions, 3A–81, –199, –209
Medical climatology, 3A–184
Observational and climatic data, 3A–5, –6, –37, –44, –49, –54, –58, –63 to –65, –68, –72 to –74, –91, –102, –123, –127, –148, –181
Synoptic meteorology, 3A–289
Synoptic studies, 3A–284
Atmospheric circulation, 3A–185
Waterspouts, 3A–187
Radiation
Solar radiation, 3A–139
Light of the night sky, transmission coefficients, 3A–285
Temperature, 3A–43, –56, –75, –133, –218
Frost, 3A–187
Atmospheric pressure, 3A–55, –170
Winds, 3A–185, –187
Dust storms, 3A–152
Sandstorms, 3A–291
Wind data, 3A–171, –172
Upper air winds, 3A–170 to –172
Humidity, 3A–218
Precipitation, 3A–32, –56, –66, –116, –134, –140, –148, –149, –162, –209, –210
Drought, 3A–162
Snow, 3A–51
Optical phenomena, 3A–119
Sunspots, 3A–140

Madeira
Climatology, 3A–95, –196, –230, –241
Aeronautical climatology, 3A–230, –241, –248
Agricultural climatology, 3A–293
Bioclimatology, 3A–230

Morocco (including Spanish Morocco)
Bibliographies, 3A–187, –190
Meteorological stations, 3A–190
Climatology, 3A–22, –30, –40, –45, –48, –61, –70, –126, –141, –146, –167, –187, –206, –222, –229, –249, –262, –265, –269, –273, –297
Aeronautical climatology, 3A–86, –241, –275, –278
Agricultural climatology, 3A–166, –189, –190, –245
Bioclimatology, 3A–48
Climatic changes, 3A–277, 3A–302
Medical climatology, 3A–265
Mountain meteorology, 3A–206
Paleoclimatology, 3A–222
Observational and climatic data, 3A–6, –15, –29, –48, –62, –90, –98, –126, –137, –141, –167, –173, –214, –221, –235, –256, –299
Synoptic studies and forecasting, 3A–159
Frost forecasting, 3A–301
Synoptic charts, 3A–137
Waterspouts, 3A–156, –190
Weather types, 3A–85
Solar radiation, 3A–145, –157, –58, –190, –197, –264
Temperature, 3A–98, –190
Frost, 3A–144, –159, –190, –259
Nocturnal cooling, 3A–207
Temperature data, 3A–188
Temperature variations, 3A–224
Winds, 3A–143, –190
Trade winds, 3A–86
Upper air winds, 3A–168
Evaporation, 3A–228
Precipitation, 3A–61, –78, –94, –98, –147, –182, –190, –221, –240, –245, –300
Precipitation distribution, 3A–200
Snow, 3A–159, –190
Turbidity, 3A–190, –207
Atmospheric transparency, 3A–158
Geophysics, 3A–187, –269
Oceanography, 3A–126

Sahara Desert (in general)
Bibliographies, 3A–296
Meteorological services, 3A–118
Climatology, 3A–13, –19, –92, –106, –110, –112, –113, –118, –120, –129, –153, –160, –163, –223, –234, –238, –247, –252, –258, –288, –295, –296
Climatic changes, 3A–105, –113, –129, –191
Climatic types, 3A–254
Climatic data, 3A–16, –92, –106, –110, –129, –294, –295
Continentality, 3A–83
Medical meteorology, 3A–161
Atmospheric pollution, 3A–198
Atmospheric circulation, 3A–208, –254

Upper air observation, 3A–169
Air masses and fronts, 3A–79
Atmospheric disturbances, 3A–101, –236
Solar radiation, 3A–109, –139, –186
Temperature, 3A–133
Atmospheric pressure, 3A–153
Winds, 3A–128
Sandstorms, 3A–183, –198, –227, –233, –252
Sirocco, 3A–236
Evaporation, 3A–288
Cloudiness, 3A–208
Precipitation, 3A–208, –219, –220, –247, –258, –271
Floods, 3A–219
Mud rains, 3A–183
Turbidity, 3A–186
Morphology, 3A–128
Spanish West Africa (including **Sidi Ifni and Spanish Sahara**)
Climatology, 3A–281
Observational data, 3A–298
Katabatic winds, 3A–272
Precipitation, 3A–271
Tunisia
Climatology, 3A–33, –82, –71, –141, –241, –257, –273
Aeronautical climatology, 3A–82, –241
Bioclimatology, 3A–283
Climatic changes, 3A–244
Climatic variations, 3A–287
Continentality, 3A–188
Medical climatology, 3A–1
Observational and climatic data, 3A–14, –33, –46, –71, –138, –141, –173, –204, –216, –217, –225, –235
Upper air data, 3A–82, –138, –173
Long range forecasting, 3A–257
Solar radiation, 3A–103, –286
Insolation, 3A–193
Radiation instruments, 3A–103
Temperature, 3A–47
Winds
Sandstorms, 3A–183
Whirlwinds, 3A–263
Evaporation, 3A–175, –286
Water vapor, 3A–231
Precipitation, 3A–24, –31, –47, –89, –96, –182, –203, –216, –276, –283
Mud rains, 3A–183
Precipitation data, 3A–47, –203, –205
Precipitation extremes, 3A–194, –205
Visibility, 3A–231

BIBLIOGRAPHY ON CLIMATOLOGY OF NORTHWEST AFRICA

1860

3A–1 551.586:616

Ferrini, Giovanni, **Saggio sul clima e sulla precipue malattie della citta di Tunisi e del regno.** [Essay on the climate and the disease of the city of Tunis and vicinity.] Milan, **1860.** 317 p. numerous refs. **NN**—Detailed early study of the climate of Tunisia, giving descriptive accounts of: location, geography, etc.; usual climatic elements; effects of climate on agriculture and, particularly, climatic factors in disease and health in the region. Study is mostly medical in compass. *Subject Headings:* **1. Medical climatology 2. Tunis, Tunisia.**

1872

3A–2 551.582(65)

*Algeria. Service Météorologique, **Panorama météorologique du climat d'Alger; observations météorologiques, Jan. 1872.** [Meteorological panorama of the climate of Algiers; meteorological observations, Jan. 1872.] Also: . . . **1873.** Algiers, **1872–1873.** 14 p. map, 33 tables. **DWB**—Detailed early study. Position and instruments of the observatory at Algiers are described. Tables include observations of the usual climatic elements kept since 1859, plus thorough explanatory text. *Subject Headings:* **1. Climatology 2. Algiers, Algeria.**

1874

3A–3 551.577.2(65)

*Raulin, Victor, **Régime pluvial de l'Algérie.** . . . [On the rainfall regime of Algeria. . . .] *Académie Nationale des Sciences, Belles-Lettres et Arts de Bordeaux, Actes,* 3rd Ser., 36:351–440, **1874.** numerous tables. **DLC.** Reprint. **DWB**—Rainfall data for long periods in 19th century from numerous stations in the departments of Oran, Algeirs and Constantine are tabulated with explanatory notes. Evaporation data for Constantine and Algiers are included. Also: similar article by same author in *Gasette Medicale d'Algérie,* 1883. Unchecked. *Subject Headings:* **1. Precipitation 2. Evaporation 3. Algiers, Algeria 4. Oran, Algeria 5. Constantine, Algeria.**

1881

3A–4 551.582(65)

Angot, Alfred, **Étude sur le climat de l'Algérie, température, pression barométrique et pluie.** [Study on the climate of Algeria, temperature, barometric pressure and rainfall.] *France, Bureau*

Central Météorologique, Annales, 1:B-2–B-3, 1881. **NN**—Author attempts to systematicall summarize into mean monthly and annual values, for the period 1860–1879, observations of the abov elements made at scattered places by individuals and by various organizations (mostly military *Subject Headings:* **1. Climatology 2. Algeria.**

3A–5 551.506.5(6

*Hann, Julius, **Resultate der meteorologischen Beobachtungen.** [Results of meteorologic observations.] (In: Rohlfs, Gerhard, **Kufra.** [Cufra (oasis).] Leipzig, **1881.** p. 353–364 **NNA**—Results of meteorological observations made on a trip from Tripoli to Oasis of Cufra, Liby 1878–1879 are summarized. Data given in "diary" form. *Subject Headings:* **1. Expeditiona climatic data 2. Cufra Oasis, Libya. I. Rohlfs, Gerhard.**

1882

3A–6 551.58

*Teisserenc de Bort, Léon, **Observations météorologiques faites dans les postes consulai français.** [Meteorological observations made at the French consular posts.] *France, Burea Central Météorologique, Annales*, [No.] 4, **1882. NN**—Includes tabulated summaries and bri discussion of fragmentary meteorological observations for Tripoli, Rabat, Canary Islands, Azore Ismailia, Suez, mostly for 1880–1882, but including some 1819–1821 for Tripoli. *Subject Heading* **1. Climatic data 2. Tripoli, Libya 3. Rabat, Morocco 4. Canary Islands 5. Azores 6. Ismaili Egypt 7. Suez, Egypt.**

1885

3A–7 551.578.7(6

*Algeria. Service Météorologique, **Statistique de la grêle tombée en Algérie pendant les d dernières années (de 1876 à 1885). Nombres de jours.** [Hail statistics for Algeria for the last te years (from 1876 to 1885). Numbers of days.] [Algiers, n. d.] folded sheet and map (separate **DWB**—Large table gives hail records 1876–1885 at numerous points in northern Algeria. Ma shows localities. *Subject Headings:* **1. Hail 2. Algeria.**

1887

3A–8 551.582(64

*Biermann, W., **Beiträge zur Kenntniss des Klimas der Kanarischen Inseln.** [Contribution t the knowledge of the climate of the Canary Islands.] *Meteorologische Zeitschrift*, 4(1):1–11, 188 6 tables, refs. **NN**—Climate of the islands described in general with values tabulated for individu climatic elements at Puerto de Orotava and some other stations for various periods of time durin 1874–1885. J. Hann gives some supplementary climatological values for Laguna 1872–1882, *ibid* p. 178–179. *Subject Headings:* **1. Climatology 2. Canary Islands. I. Hann, Julius.**

1888

3A–9 551.506(6

*Algeria. Service Météorologique, **Observations météorologiques du Réseau Africain, 1878–8 1883–85.** [Meteorological observations from the African network. . . .] Reprints from: *Franc Bureau Central Météorologique, Annales*, **1880–1888.** extensive tables. **DWB**—Mean monthl values of the various climatic elements at numerous stations in Algeria are tabulated for each yea *Subject Headings:* **1. Climatic data 2. Algeria.**

3A–10 551.506:551.577(6

*Algeria. Service Météorologique, **Quantités de pluies recueillies en Algérie de l'année 187 à l'année 1886 inclus.** [Rainfall amounts recorded in Algeria from 1877 to 1886 inclusive.] Algier **1888.** 11 p. fold. map, tables. **DWB**—Monthly rainfall totals for each year are tabulated fo numerous points of northern Algeria and a rainfall map is constructed. *Subject Headings:* **1. Pre cipitation 2. Climatic data 3. Algeria.**

1889

3A–11 551.506.1(6

*Algeria. Service Météorologique, **Bulletin Mensuel.** Jan. **1874**–July **1875**; Dec. **1884**–Fe **1889.** charts, tables. **DWB**—Monthly bulletins include observational data, illustrative an comparative graphs, curves and charts and some summary and explanatory text. *Subject Heading* **1. Observational data 2. Algeria.**

1893

3A–12 551.582(65, 661.

*Hann, Julius, **Zum Klima der algerischen Sahara.** [On the climate of the Algerian Sahara *Meteorologische Zeitschrift*, 10(12):467–471, Dec. **1893.** tables. **DLC**—Analysis of temperatu

humidity, cloudiness and rain data at Touggourt for June–Dec. 1891; temperature and rainfall for Ayata for 1888–1892 and a summary of meteorological observations at Ghardaïa for 1887–1892. Geographical coordinates and altitude given for each station. Preceding this article is a summary of meteorological observations for Ayata for the period from Oct. 1891–Dec. 1892. *Subject Headings:* **1. Climatic data 2. Algeria 3. Sahara Desert.**—*M.L.R.*

3A–13 551.582(661)

Schirmer, Henri. **Les causes atmosphériques du desert.** . . . [Atmospheric causes of the desert . . . and other chapters on: precipitation, temperature, evaporation, climatic change.] (In his: **Le Sahara.** Paris, **1893.** p. 24–139. figs., refs.) **DWB**—Lengthy, generalized, descriptive accounts of various climatic factors of the Sahara with numerous references in footnotes but very little data. *Subject Headings:* **1. Climatology 2. Sahara Desert.**

1895

3A–14 551.506(611)

*Hann, Julius. **Klima von Gabes (Tunis).** [Climate of Gabes, Tunisia.] *Meteorologische Zeitschrift*, 12:236, **1895.** table. **DWB**—Climatic data for 1886–1889 are summarized. *Subject Headings:* **1. Climatic data 2. Gabes, Tunisia.**

3A–15 551.506(64)

*Hann, Julius. **Zum Klima von Marokko.** [On the climate of Morocco.] *Meteorologische Zeitschrift*, 12:111, **1895.** table. **DWB**—Brief summary table of observations kept in winter 1886–1887 at the French Consulate in Morocco. *Subject Headings:* **1. Climatic data 2. Morocco.**

3A–16 551.506(661)

*Rolland, Georges. **Rapport météorologique. Contribution à la connaissance du climat Saharien.** [Meteorological report. Contribution to the knowledge of the climate of the Sahara.] (In: Choisy, Auguste, **Chemin de fer transaharien.** [Trans-Sahara railroad.] Vol. 3. Paris, **1890–1895.** p. 327–417. extensive tables.) **NN**—Tables (with introductory explanation) give the detailed meteorological observations made systematically in the Sahara by the author Jan.–April, **1880.** *Subject Headings:* **1. Fragmentary climatic data 2. Sahara Desert. I. Choisy, Auguste.**

1896

3A–17 551.582(65)

§Thevenet, A., **Essai de climatologie algérienne.** [Essay on Algerian climatology.] Algiers, **1896.** 118 p. 44 plates, numerous tables. **DWB**—An exhaustive study of Algerian climate (for that time) discussing each climatic element individually and in great detail, as well as giving a physical description of the country and geographical locations of observation stations. (Some observations kept since 1875.) Numerous charts, curves and diagrams illustrate climatic conditions. Air mass analysis and forecasting problems are included, with representative pressure charts for particular days. *Subject Headings:* **1. Climatology 2. Algeria.**

1897

3A–18 551.582(65)

Sambuc, C., **Recherches sur le climat d'Alger.** [Research on the climate of Algiers.] Toulon, **1897.** Unchecked.—Annual distribution of rainfall studied, using observations 1843–1896. Curve drawn of mean monthly rainfall for 50 years. *Subject Headings:* **1. Climatology 2. Precipitation 3. Algiers, Algeria.**

1898

3A–19 551.582(65)

*Hann, Julius, **Zum Klima der algerischen Sahara.** [On the climate of the Algerian Sahara.] *Meteorologische Zeitschrift*, 15:69, **1898.** 2 tables, ref. **DWB**—Results of meteorological observations at El Golea Oasis, 1892–1895, in the Algerian Sahara are summarized. (*See also* 3A–12 above.) *Subject Headings:* **1. Climatology 2. Sahara Desert 3. Algeria.**

3A–20 551.582(612)

Zum Klima von Tripoli. [On the climate of Tripoli.] *Meteorologische Zeitschrift*, 15:270–271, **1898.** table. **DWB**—Some meteorological observations kept in Tripoli, 1892–1895, are briefly summarized with values for temperature and precipitation tabulated. *Subject Headings:* **1. Climatology 2. Tripoli, Libya.**

1899

3A–21 551.506(65)

*Algeria. Service Météorologique, **Météorologie.** Paris, **1899.** 24 p. tables. Extract from: *Algeria, Service de la Statistique Générale, Statistique Générale de l'Algérie pour les années 1876 à 1878.* **DWB**—Work consists entirely of tables of monthly means for 1877 and 1888 of usual elements for Oran, Algiers and Constantine. *Subject Headings:* **1. Climatic data 2. Oran, Algeria 3. Algiers, Algeria 4. Constantine, Algeria.**

1900

3A–22 551.582(64)

Fischer, Theobold, **Zur Klimatologie von Marokko.** [Climatology of Morocco.] *Gesellschaft für Erdkunde zu Berlin, Zeitschrift,* 35:365–417, **1900.** map, table, refs. **NN**—Early, but detailed, descriptive work on the climate of Morocco using personal observations as well as references and including a rainfall map of the country. Observational results are discussed, but not systematically tabulated. *Subject Headings:* **1. Climatology 2. Morocco.**

3A–23 551.506(65)

*Hann, Julius, **Resultate der meteorologischen Beobachtungen zu Ayata in Algerien.** [Results of meteorological observations in Ayata in Algeria.] *Meteorologische Zeitschrift,* 17:570, **1900.** table. **DWB**—Results of Cornu's climatological observations at Ayata in Algerian Sahara are summarized by month for 1897 and 1898. *Subject Headings:* **1. Climatology 2. Climatic data 3. Ayata, Algeria.**

1901

3A–24 551.577(611)

*Ginestous, G., **Les pluies en Tunisie.** [Rainfall of Tunisia.] Tunis, Service Météorologique, **1901.** 87 p. maps, diagrs., tables. **DLC**—Fifteen years of rainfall observations at numerous stations of Tunis are tabulated, charted and analyzed. Monthly, seasonal, annual and regional variations, distribution, etc. are considered. Wind roses for each season at principal stations are included. *Subject Headings:* **1. Precipitation 2. Tunisia.**

1902

3A–25 551.525.2(65)

Rivière, Ch., **Refroidissements nocturnes de l'air et du sol.** [Nocturnal cooling of the air and the soil.] *Société Nationale d'Acclimatation de France, Bulletin,* 49:281–343, **1902.** 13 figs. **NN**—Author writes from his experience of 32 years in Algiers. Most data are in descriptive or graphic form. His aim is to determine climatic conditions as they affect vegetation and agriculture. He includes temperature records kept at different points in the region. *Subject Headings:* **1. Nocturnal cooling 2. Agricultural climatology 3. Algiers, Algeria.**

1903

3A–26 551.577(65)

Cornu, —, **Observations pluviométriques à Ayata (Algérie).** [Rainfall observations at Ayata (Algeria).] *Société Météorologique de France, Annuaire,* 51:68, **1903.** table. **NN**—Monthly rainfall totals for 1893, 1899–1902, are summarized briefly in tables. (*See also* 3A–39 below.) *Subject Headings:* **1. Precipitation 2. Ayata, Algeria.**

3A–27 551.577.2(65)

Gauckler, Philippe, **La pluie à Alger.** [Rainfall in Algiers.] *Annales de Géographie,* Paris, 12:324–338, **1903.** 2 graphs, 2 refs. **NNA**—Author questions the reliability of most early rainfall observations, notably the data sources of Thevenet (1896), Raulin (1876) and Angot (1881), but cites two series that he does consider reliable (analyzed by Sambuc, 1897). Gauckler further discusses these data, 1843–1901, and presents his results graphically. He includes some discussion of the effects of rainfall conditions on the economy of Algiers. *Subject Headings:* **1. Precipitation 2. Algiers, Algeria.**

3A–28 551.582:016(612)

†Minutilli, Federico, **Bibliografia della Libia.** [Bibliography on Libya.] Torino, **1903.** 136 p. refs. **DLC**—Contains section (p. 6–7, items 56–67) on climate, chronologically arranged 1859–1896. Contains references to several very early works not contained in the present bibliography. *Subject Headings:* **1. Bibliographies 2. Climatology 3. Libya.**

1904

3A–29 551.506(64)

*Hann, Julius, **Resultate der meteorologischen Beobachtungen zu Marrakesch 1900 und 1901.** [Results of meteorological observations at Marrakech 1900 and 1901.] *Meteorologische Zeitschrift*, 21:334–335, **1904.** 2 tables. **DWB**—French observations in 1900 and 1901 are summarized in tables. *Subject Headings:* **1. Climatic data 2. Marrakech, Morocco.**

1905

3A–30 551.582(64)

*Hann, Julius, **Resultate meteorologischer Beobachtungen zu Tangier 1879–85 . . . 1898–1901.** [Results of meteorological observations at Tangier 1879–1885 . . . 1898–1901.] *Meteorologische Zeitschrift*, 4:26–28, **1887**; 22:33, **1905.** tables. **DWB**—Normals of climatic elements calculated from observations made three times daily are summarized in tables. *Subject Headings:* **1. Climatology 2. Tangier, Morocco.**

1906

3A–31 551.577.2(65)

*Angot, Alfred, **La pluie à Misserghin (Oran).** [Rain at Misserghin (Oran).] *Société Météorologique de France, Annuaire*, 54:102–104, **1906.** table. **NN**—Monthly rainfall totals are tabulated for each year, 1883–1904. Also: **Observations météorologiques à Metlaoui (Tunisie).** *Ibid.*, p. 104–105. table. **NN**—Temperature, pressure and rainfall means May–Dec., 1905, summarized briefly. *Subject Headings:* **1. Precipitation 2. Oran, Algeria 3. Tunisia.**

3A–32 551.577.2(262)

*Angot, A., **Régime pluviométrique de la Mediterranée. 2. Tripolitaine.** [Rainfall regime of the Mediterranean. 2. Tripolitania.] *Société Météorologique de France, Annuaire*, 54:119–122, **1906.** 3 tables. **NN**—French and Italian rainfall observations at Bengasi, 1886–1905, and at Tripoli, 1879–1896, are summarized and briefly discussed. *Subject Headings:* **1. Precipitation 2. Bengasi, Libya 3. Tripoli, Libya.**

3A–33 551.582(611)

*§Ginestous, G., **Études sur le climat de la Tunisie.** [Study of the climate of Tunisia.] Tunis, **1906.** 427 p. numerous maps, diagrams, tables. **DWB**—An exhaustive study (begun in 1894) of the climate of Tunisia, taking up each climatic element separately in detail. Much material for the years 1885–1904 is included in tabular form (but is somewhat uncritically dealt with, the positions and heights of the stations being omitted). Charts showing isolines for various elements, seasonal wind directions, pressure distribution on particular days, diagrams, curves and graphs, wind roses, etc. are included. As well as a detailed analysis of each element, general comparison is made of climates of Tunisia and France. A similar study, same title, same author, Tunis, 1903, having only 177 p. but many illustrations and data is also available at **DWB, DLC.** *Subject Headings:* **1. Climatology 2. Climatic data 3. Tunisia.**

3A–34 551.577.2(61)

*Knoch, Karl, **Die Niederschlagsverhältnisse der Atlasländer.** [Rainfall conditions of the Atlas countries.] Reprint from: *Verein für Geographie und Statistik, Jahresbericht*, Frankfurt a. M., **1905–1906.** 86 p. 2 fold. maps, 3 diagrams, 7 tables, refs. **DWB**—General topographic and climatic conditions of the Atlas region are reviewed, along with summary of earlier works on subject. Rainfall conditions are taken up in detail, considering distribution, annual occurrence, days of rain, snow, resulting river and vegetation conditions. Normals reduced to 15 years, 1886–1900. *Subject Headings:* **1. Precipitation 2. Atlas Mountains 3. Northwest Africa.**

3A–35 551.577.2(65)

Rivière, Ch., **La pluie à Alger d'apres les observations faites au Jardin d'Essai de 1868 à 1905.** [Rain at Algiers from observations made at the Experimental Garden 1868 to 1905.] *Société Météorologique de France, Annuaire*, 54:68–71, **1906.** table. **NN.** Also in *Meteorologische Zeitschrift*, Vol. 23, **1906.** Unchecked. **DWB**—Table contains mean monthly rainfall totals 1868–1905, with brief discussion. *Subject Headings:* **1. Precipitation 2. Algiers, Algeria.**

1907

3A–36 551.582

Burchard, Oscar, **Ein Beitrag zur Klimatologie der Kanarischen Inseln.** [A contribution to the climatology of the Canary Islands.] *Meteorologische Zeitschrift*, 24:64–74, **1907.** fig., 6 tables, refs. **NN**—The general climatic set-up of the ocean-tempered Canary Islands is noted. Then the in-

dividual elements are discussed, and monthly values for 1905 tabulated. *Subject Headings:* 1. **Climatology 2. Canary Islands.**

1908

3A–37 551.582(612)

*Martinuzzi, Pietro and Eredia, Filippo, **Il clima di Tripoli di Barberia.** [Climate of Tripoli of Barbary.] *Italy, Ufficio Centrale di Meteorologia e Geodinamica, Annali*, 30, Part 1:1–82, **1908.** 8 diagrs., numerous tables, refs. Reprint. **DWB**—Various climatic elements of the city are described and observations, 1892–1907, are summarized in detail in tables. *Subject Headings:* **1. Climatology 2. Climatic data 3. Tripoli, Libya.**

1909

3A–38 551.582.1(65)

Lespès, R., **Le climat de la Kabylie du Ajurdjura.** [The climate of the Kabylie of Ajurdjura.] *Annales de Géographie*, Paris, 18:24–33, **1909.** refs. **NN**—Descriptive account of the climate of this highest of the coastal ranges of Algeria. *Subject Headings:* **1. Climatology 2. Ajurjura, Algeria.**

3A–39 551.506(65)

Observations météorologiques faites à Ayata et Sidi-Yahia (Algérie) 1893–1907. [Meteorological observations made at Ayata and Sidi-Yahia (Algeria) 1893–1907.] *Société Météorologique de France Annuaire*, 57:137–138, **1909.** 2 tables. **NN**—Meteorological observations at Ayata, 1901–1907, and at Sidi-Yahia, 1905–1907, are summarized by month for each year. *Subject Headings:* **1. Climatic data 2. Ayata, Algeria 3. Sidi-Yahia, Algeria.**

1910

3A–40 551.582(64)

*Hann, Julius, **Klima von Mogador, Marokko.** [Climate of Mogador, Morocco.] *Meteorologische Zeitschrift*, 27:377–378, **1910.** 4 tables, 2 refs. **DWB**—Observations made at Mogador, 1894–1907, are summarized in tables. *Also: Ibid.*, 18:76–79, 1901. Results of observations at Mogador, 1894–1898, are summarized. *Subject Headings:* **1. Climatology 2. Mogador, Morocco.**

1911

3A–41 551.583.2

†Gsell, Stéphane, **Le climat de l'Afrique du nord dans l'antiquité.** [The climate of North Africa in antiquity.] *Revue Africaine*, Algiers, 55:343–410, **1911.** numerous refs. Reprint. **NNA**—Extensive historical survey made. Author begins by describing present climate referring to numerous works on the subject, but giving no data; then he reviews earlier works that give indication of climatic conditions as far back as the pre-Christian era; he discusses the regions by sections. *Subject Headings:* **1. Historical climates 2. North Africa.**

1912

3A–42 551.582(61

Cufino, L., **Il clima di Tripoli e di Bengasi.** [The climate of Tripoli and Bengasi.] (*R. Società Geografica Italiana, Bollettino, 5th Ser.*, 1:636–642, **1912.** 2 refs. **NNA**—General review and comparison of climates of the two cities, citing data in text, referring to more extensive work by Eredia, but giving no original observational data. *Subject Headings:* **1. Climatology 2. Tripoli Libya 3. Bengasi, Libya.**

3A–43 551.506:551.524(612

*Eredia, Filippo, **Andamento diurno della temperatura a Tripoli.** [Daily regime of temperature at Tripoli.] (*R.*) *Accademia Nazionale dei Lincei, Rendiconti*, Rome, 21st Ser., 5:58–65, **1912.** 2 figs., tables, 2 refs. **NNA**—Temperature observations kept somewhat irregularly since 1892 at Tripoli are summarized in tables and isopleths. *Subject Headings:* **1. Temperature data 2. Tripoli Libya.**

3A–44 551.582(61

*Eredia, Filippo, **Climatologia di Tripoli e Bengasi.** [Climatology of Tripoli and Bengasi.] *Italy, Ministero delle Colonie, Monografie e Rapporti Coloniali*, No. 4, **1912.** 79 p. tables. **NN**—Climatological elements for Tripoli and for Bengasi are taken up separately and in detail, pressure, temperature, humidity, cloud, etc. *Subject Headings:* **1. Climatology 2. Climatic data 3. Tripoli Libya 4. Bengasi, Libya.**

3A–45 551.582(64)

Ogilvie, Alan G., **Morocco and its future.** *Geographical Journal*, 39:554–575, June **1912. NNA**—The abstract in *Royal Meteorological Society, Quarterly Journal*, 38:240–242, 1912, summarizes well that part of the original which deals with climates; original is descriptive with no data. *Subject Headings:* **1. Climatology 2. Morocco.**

3A–46 551.506.1(611)

*Tunis. Service Météorologique, **[Relevés Généraux.] [Années] 1907–1911.** Tunis, **1910–1912.** 3 Vols. **DWB**—Meteorological data from numerous stations in Tunisia are tabulated monthly in official periodical. *Subject Headings:* **1. Observational data 2. Tunisia.**

1914

3A–47 551.506:551.577:551.524(611)

*Ginestous, G., **Période 1900–1910. Moyenne de la répartition des pluies d'octobre à mai.** [Period 1900–1910; average distribution of rainfall Oct. to May.] *Association Française pour l'Avancement des Sciences, Compte Rendu*, 42:229–235, **1914.** tables. **NN**—Work consists entirely of tables. One series shows distribution of rainfall October to May in numerous towns of Tunis; another, temperature values observed at 30 stations in Tunis, 1906–1910, means, maxima, minima. *Subject Headings:* **1. Precipitation data 2. Temperature data 3. Tunisia.**

3A–48 551.586:551.582(64)

*von Maur, Heinrich, **Das Klima von Mogador und sein Einfluss auf Menschen, Tiere und Pflanzen.** [The climate of Mogador and its influence on men, animals and plants.] *Hamburg, Deutsche Seewarte, Deutsche Überseeische Meteorologische Beobachtungen*, 23:A16, A4–A8, **[1913–1914.]** Also observations for Casablanca, *ibid.*, p. A3. **DWB**—General climatic data for these places are tabulated, along with brief remarks. *Subject Headings:* **1. Climatology 2. Climatic data 3. Bioclimatology 4. Mogador, Morocco 5. Casablanca, Morocco.**

1916

3A–49 551.582(612)

*Eredia, Filippo, **Sul clima di Ghadàmes.** [The climate of Ghadames.] *Italy, Ministero delle Colonie, Bollettino d'Informazioni*, 4(4–6), **1916.** Extract. 25 p. figs., tables, refs. **NNA**—Climatological data, 1913 1914, are given and discussed for this oasis of western Tripolitania. *Subject Headings:* **1. Climatology 2. Climatic data 3. Ghadames, Tripolitania.**

3A–50 551.583.2

†Negro, Carlo, **Sul clima della Libia attraverso i tempi storici.** [On the climate of Libya during historic time.] *Accademia Pontifica dei Nuovi Lincei, Rome, Memoria, 2nd Ser.*, **1, 1913, 1915; 2, 1916. DLC**—An exhaustive discussion of literary and historical records from Roman times. Author considers that there has been no progressive desiccation of Libya during the historical period. (*Same abstract* as G–127 in July 1950 *Meteorological Abstracts.*) *Subject Headings:* **1. Climatic changes 2. Historical climates 3. Libya.**—*C.E.P.B.*

1917

3A–51 551.578.4(612)

Eredia, Filippo, **La neve in Tripolitania.** [Snow in Tripolitania.] *Italy, Minstero delle Colonie, Bollettino d'Informazioni*, 4(10–12):539–548, **1917.** 4 photos. Reprint. **NNA**—Conditions, amounts, distribution of snow and accompanying storms, meteorological conditions, etc., in Tripolitania, Feb. 13–17, 1913 are discussed. *Subject Headings:* **1. Snow 2. Tripolitania.**

3A–52 551.513:551.54

†*Lyons, H. G., **The distribution of pressure and the air circulation over northern Africa.** *Royal Meteorological Society, Quarterly Journal*, 43:116–150, **1917.** 6 figs., 5 tables, numerous refs. **NNA**—Charts show isobars over all of North Africa in different seasons. Tables give values for pressure, wind directions, etc. Author surveys works on pressure and winds over the region up to that time and attempts to establish patterns of the distribution of pressure and of circulation of air over northern Africa at different seasons of the year. *Subject Headings:* **1. Atmospheric circulation 2. Pressure distribution 3. Climatic data 4. North Africa.**

1919

3A–53 551.582.2(612)

*Eredia, Filippo, **Contributo alla climatologia del Gebel.** [Contribution to the climatology of Gebel.] Florence, Istituto Agricolo Coloniale Italiano, **1919.** 17 p. tables, 3 refs. Reprint from:

Agricoltura Coloniale, Vol. 13, Feb. **1919. DWB, NNA**—Descriptive account made, accompanied by tabulated observational data, for May 1913 to May 1915, principally of temperature, but with some brief notations on other elements, for this mountain location of Tripolitania. *Subject Headings:* **1. Climatology 2. Gebel, Tripolitania.**

3A–54 551.582(612)

*Eredia, Filippo, **Il clima di Zuara.** [The climate of Zuara.] *Italy, Ministero delle Colonie, Bollettino d'Informazioni*, 6(1):141–157, Oct. **1919.** tables. **NNA**—Maximum and minimum temperatures by day for each month November 1912–June 1915 are tabulated, as well as summarized means for temperatures, precipitation and winds, and results are discussed for this seaport town of northwest Tripolitania. *Subject Headings:* **1. Climatology 2. Climatic data 3. Zuara, Tripolitania.**

3A–55 551.542

Eredia, Filippo, **La pressione barometrica à Tripoli.** [The barometric pressure at Tripoli.] (*R.*) *Società Geografica Italiana, Bollettino*, 5th Ser., 8(3–4):216–219, **1919.** tables, 3 refs. **NNA**—Monthly values of barometric pressure averaged by months 1893–1918 are summarized in table. Hourly values are averaged for 1912–1916. Brief discussion of data, sources, methods of observation, etc. are included. *Subject Headings:* **1. Atmospheric pressure 2. Tripoli, Libya.**

3A–56 551.524.2 551.577.2(612)

Eredia, Filippo, **La temperatura dell'aria e le precipitazioni acquee dell'Oasi di Zanzur (Tripolitania).** [The temperature of the air and the precipitation at the Oasis of Zanzur.] (*R.*) *Società Geografica Italiana, Bollettino*, 5th Ser., 8(5–6):361–366, **1919.** tables. **NNA**—Descriptive account with some summary tables of various climatic values derived from one or two years observations. *Subject Headings:* **1. Temperature 2. Precipitation 3. Zanzur Oasis, Tripolitania.**

3A–57 551.582(65)

†*Rouch, Jules Alfred Pierre, **Notice météorologique sur les côtes de France et d'Algérie.** [Meteorological note on the coasts of France and of Algeria.] *France, Service Hydrographique*. [*Publication*] No. 62, **1919.** 133 p. plates, charts, tables. **DWB, NNA**—Section on the French coasts of the western Mediterranean p. 75–133 (plates, 23 tables, refs.). A general survey of meteorological conditions is made for use in navigation and flying along the Mediterranean coasts belonging to France. Local and regional winds, types of weather, fog, visibility conditions, state of sea, etc., as well as the usual climatic elements are discussed, and tables are given of values from various stations. Section of Algeria includes stations at Djebel Krichtel, Bouzarea, Cap Carbon, Cap Bougaroni, Cap de Garde. *Subject Headings:* **1. Aeronautical climatology 2. Western Mediterranean 3. Algerian Coast 4. French Coast.**

1920

3A–58 551.582(614)

*Eredia, Filippo, **Il clima di Cirene.** [The climate of Cyrenaica.] *Italy, Ministero delle Colonie, Bollettino d'Informazioni*, 8(7–9):274–293, **1920.** tables. **NNA** Account of usual climatic elements with extensive tables of maximum and minimum daily temperatures, Jan. 1915–Dec. 1918, and others of temperature means, variations, and precipitation. Immediately following, p. 294–301, are tables of meteorological observations made Jan.–April, 1920, at numerous locations in Tripolitania and Cyrenaica. *Subject Headings:* **1. Climatology 2. Climatic data 3. Cyrenaica.**

3A–59 551.582(612)

*Eredia, Filippo, **Il clima di Zauia (Tripolitania).** [The climate of Zauia.] *Italy, Ministero delle Colonie, Bollettino d'Informazioni*, 8(1–6):96–105, **1920.** tables, 2 refs. **NNA**—Tabulated climatological values and discussion, 1913–1915, for this section of Tripolitania are given. *Subject Headings:* **1. Climatology 2. Climatic data 3. Zauia, Tripolitania.**

3A–60 551.583

Rivière, Ch., **Invariabilité du climat du nord de l'Afrique depuis les temps historiques.** [Invariability of the climate of North Africa since historic times.] *Revue d'Histoire Naturelle Appliquée*, 1:71–79, **1920. NN**—Evidence frequently used to point out climatic changes in North Africa (mostly NW part) is discussed and generally refuted. Author concludes that human activities have caused only changes. *Subject Headings:* **1. Climatic changes 2. North Africa.**

1921

3A–61 551.506:551.577(64)

*Bernard, Augustin, **Le régime des pluies au Maroc.** [The rainfall regime in Morocco.] *Société des Sciences Naturelles du Maroc, Mémoires*, 1(1), **1921.** 80 p. 3 fold. plates, numerous

tables, refs. **NN**—As much information as possible on rainfall in Morocco, 1914-1920, is collected. Regional variations, other meteorological elements, seasonal differences, snow, hydrological factors, effects on vegetation and agriculture are also considered. Numerous tables, record values, and charts and map serve as further illustrations of rainfall distribution and frequency. *Subject Headings:* **1. Precipitation data 2. Climatology 3. Morocco.**

3A–62 551.582(64)

*Brooks, Charles E. P., **Meteorological observations at Cape Spartel, Morocco, 1893–1920.** *Royal Meteorological Society, Quarterly Journal*, 47:141–145, **1921.** 6 tables. **DWB**—A "valuable series of meteorological observations" is summarized in tables. One table gives a summary for the whole period based on observations at 9h. and 21h.; the second, monthly means of pressure; the third, corresponding values of temperature; the fourth, monthly rainfall totals; the fifth and sixth, diurnal variations of relative humidity, cloudiness and wind as shown by observations at three separate hours. *Subject Headings:* **1. Climatic data 2. Cape Spartel, Morocco.**

3A–63 551.582(612)

*Eredia, Filippo, **Contributo al clima di Orfella.** [Contribution to the climate of Orfella.] *Italy, Ministero delle Colonie, Bollettino d'Informazioni*, 9(9–10):541–549, **1921.** tables, ref. **NNA**—Climatological observations made in 1913, 1914, 1915 and 1920 are summarized in tables and discussed for this location near Tripoli. *Subject Headings:* **1. Climatology 2. Climatic data 3. Orfella, Tripolitania.**

3A–64 551.582(612)

*Eredia, Filippo, **Sul clima di Cussabat.** [The climate of Cussabat.] *Italy, Ministero delle Colonie, Bollettino d'Informazioni*, 9(7–8):413–427, **1921.** tables, ref. **NNA**—Climatological observations kept 1913–1915 are summarized in tables and discussed for this town in the olive-growing region of northern Tripolitania. *Subject Headings:* **1. Climatology 2. Climatic data 3. Cussabat, Tripolitania.**

3A–65 551.582(612)

*Eredia, Filippo, **Sul clima del Garian.** [On the climate of Garian.] *Italy, Ministero delle Colonie, Bollettino d'Informazioni*, 9(3–4):147–172, **1921.** tables. **NNA**—Climatological observations 1913-1920 are summarized and discussed in some detail for this town, located 40 miles south of Tripoli. *Subject Headings:* **1. Climatology 2. Climatic data 3. Garian, Tripolitania.**

3A–66 551.577.2(612)

Eredia, Filippo, **Sulla precipitazione acquea normale annuale a Tripoli.** [Normal annual precipitation at Tripoli.] *Agricoltura Coloniale*, Florence, 15(8):3–8, **1921.** table, 3 refs. **NNA**—Brief descriptive account with one table summarizing rainfall observations for 1912–1920 and giving some earlier values, 1892–1911, for the city of Tripoli. *Subject Headings:* **1. Precipitation 2. Tripoli, Libya.**

3A-67 551.583.2

Trouessart, E., **Le climat du Nord de l'Afrique d'après les géologues.** [Climate of North Africa according to geologists.] *Revue d'Histoire Naturelle Appliquée*, 2:1–5, **1921.** refs. **NN**—Supports idea of climatic change in historic time, disagreeing with Rivière (1920). *Subject Headings:* **1. Climatic changes 2. North Africa.**

1922

3A–68 551.582(614)

*Eredia, Filippo, **Il clima di Er-Regima (Cirenaica).** [Climate of Er-Regima.] *Italy, Ministero delle Colonie, Bollettino d'Informazioni*, 10(4):451-461, **1922.** tables, ref. **NNA**—Observations of climatic elements kept 1915–1919 are summarized in tables and discussed for this town just inland from Bengasi. *Subject Headings:* **1. Climatology 2. Climatic data 3. Er-Regima, Cyrenaica.**

3A–69 551.582(612)

Eredia, Filippo, **Il clima di Misurata.** [The climate of Misurata.] *Italy, Ministero delle Colonie, Bollettino d'Informazioni*, 10(2):160–165, **1922.** tables. **NNA**—Climatological observations, 1912–1914, are summarized and discussed briefly for this coastal city of Tripolitania. *Subject Headings:* **1. Climatology 2. Misurata, Tripolitania.**

3A–70 551.582(64)

†Gentil, Louis, **Sur la climatologie du Maroc.** [On the climatology of Morocco.] *Académie des Sciences, Paris, Comptes Rendus*, 174:311–313, Jan. **1922.** 9 refs. **NN**—Climate of Morocco

summarized with reference to other works on the subject. *Subject Headings:* **1. Climatology 2 Morocco.**

3A–71 551.582(611

*Ginestous, G., **Résumé de climatologie tunisienne.** [Summary of Tunisian climatology.] Tunis, **1922.** 117 p. 39 plates, tables. **DWB**—Another thorough summary of all climatic conditions of Tunisia, particularly in regard to agricultural development. Numerous illustrative charts and diagrams are included and summaries of data, some since as early as 1885. *Subject Headings* **1. Climatology 2. Climatic data 3. Tunisia.**

1923

3A–72 551.582(612

†*Conrad, Victor, **Zum Klima von Tripolitanien.** [On the climate of Tripolitania.] *Meteorologische Zeitschrift*, 40:235–240, **1923.** tables, refs. **NN**—Author summarizes observations o various climatic elements for numerous places in Tripolitania using values recorded by other meteorologists as early as 1886 up to 1920. *Subject Headings:* **1. Climatology 2. Climatic data 3 Tripolitania.**

3A–73 551.582(612

*Eredia, Filippo, **Sul clima di Azizia (Tripolitania).** [The climate of Azizia.] *Italy, Ministero delle Colonie, Bollettino d'Informazioni*, 11(5):584–600, 1923. refs. **NNA**—Descriptive accoun with tables of monthly means for various climatic elements using observations made from 1913 t 1922. *Subject Headings:* **1. Climatology 2. Climatic data 3. Azizia, Tripolitania.**

3A–74 551.582(612

*Eredia, Filippo, **Sul clima di Tarhuna.** [On the climate of Tarhuna.] *Italy, Ministero dell Colonie, Bollettino d'Informazioni*, 11(1):80–91, **1923.** tables. **NNA**—Climatological element observed since 1913 are discussed and presented in summary tables: wind, temperature, precipitatio and cloud, for this town just inland from the coast in northern Tripolitania. *Subject Headings* **1. Climatology 2. Climatic data 3. Tarhuna, Tripolitania.**

3A–75 551.524.2(612

Eredia, Filippo, **Sur la température de l'air en Tripolitaine.** [On air temperature in Tripolitania.] *Académie des Sciences, Paris, Comptes Rendus*, 176:850–852, March **1923.** 2 tables ref. **NN**—Monthly mean and average daily variations of temperature are given and discussed fo five stations in Tripolitania, summarized from observations since 1913. *Subject Headings:* **1. Temperature 2. Tripolitania.**

3A–76 551.582(65

Franc, J., **Le climat de la Mitidja.** [Climate of the Mitidja.] *Société de Géographie d'Alger et de l'Afrique du Nord, Bulletin*, 28:169–181, **1923.** 5 diagrs., tables, refs. **NNA**—The climate o this region, which is a topographic depression between two chains of mountains in northern Algeria is described and mean monthly values for temperature, pressure, winds and precipitation are briefl tabulated or shown graphically. *Subject Headings:* **1. Climatology 2. Mitidja, Algeria.**

1924

3A–77 551.582(61

Eredia, Filippo, **Sulle prime osservazioni meteorologiche e le nuove normali climatiche Bengasi.** [Some early meteorological observations and new climatic means for Bengasi.] *Italy Ministero delle Colonie, Bollettino d'Informazioni*, 12(5):786–793, **1924.** tables, 6 refs. **NNA**—Climatological observations kept from 1881–1884 are discussed and compared to more recent one 1913–1921, in rather a brief summary treatment for this coastal city of northern Libya. *Subje Headings:* **1. Climatology 2. Bengasi, Libya.**

3A–78 551.577.2(6

*Jury, A. and Dedebant, G., **Étude sur le régime des pluies au Maroc et carte provisoire de répartition des pluies.** [Study of rainfall regime of Morocco and provisional chart of rainfa distribution.] *Société des Sciences Naturelles du Maroc, Memoires*, No. 9, **1924.** 18 p. 2 figs 13 fold. maps, 3 tables, refs. **NNA**—Authors present detailed monthly and annual rainfall ma for Morocco along with discussion of the character and origin of this rainfall, influence of relie yearly distribution, and a note on hail, as well as tables of monthly means for various locations Morocco. *Subject Headings:* **1. Precipitation 2. Morocco.**

3A–79 551.515.8(661)

Petitjean, Lucien, **Sur l'application de la frontologie aux dépressions sahariennes.** [On the application of frontology to Sahara depressions.] *Académie des Sciences, Paris, Comptes Rendus*, 179:64–65, **1924.** 3 refs. **NN**—Brief discussion of discontinuities in aerologic analysis of region. *Subject Headings:* **1. Air masses 2. Fronts 3. Sahara Desert.**

1925

3A–80 551.582(612)

Eredia, Filippo, **Alcuni nuovi aspetti di clima della Tripolitania.** [Some new aspects of the climate of Tripolitania.] *Rivista della Tripolitania*, 1(5), **1925.** Reprint, 11 p. **DWB**—Maximum and minimum temperatures at points in Tripolitania and Italy are noted using values between 1920 and 1923. Some remarks on general climate included. *Subject Headings:* **1. Climatology 2. Italy 3.Tripolitania.**

3A–81 551.582(612)

Eredia, Filippo, **Le zone climatiche della Tripolitania.** [The climatic zones of Tripolitania.] *Società Meteorologica Italiana, Bollettino*, No. 1–3, Jan. March **1925.** Extract, 3 p. 3 tables. **NNA**—Mean values for various towns in Tripolitania for temperature and rainfall are noted in summary tables, and four climatic zones are distinguished. *Subject Headings:* **1. Climatology 2. Climatic regions 3. Tripolitania.**

3A–82 551.582:629.13(611)

*Ginestous, G., **Étude climatologique du Golfe de Tunis en vue de l'aéronautique et de l'aviation.** . . . [Climatological study of the Gulf of Tunis for aeronautics and aviation . . . including climatic elements of Tunisia . . . a study of upper winds in Tunisian region (1920) . . . a study of the aerological soundings carried out at Karouba, 1920–1923.] Tunis, Service Météorologique, **1925.** 218 p. 69 figs., tables. **DWB**—An exhaustive climatological study of Gulf of Tunis region (northern Tunis), considering all climatic elements separately in detail, including besides the usual elements, consideration of thunderstorms and hail, winds at the surface, and a large section on upper air winds. Much data have been collected in tables. Rainfall, temperature, etc. maps, diagrams and wind roses are included. *Subject Headings:* **1. Climatology 2. Upper air winds 3. Aeronautical climatology 4. Gulf of Tunis 5. Tunisia.**

3A–83 551.582

Gorczyński, Władysław, **Sur le degré du continentalisme de la Tunisie et des oasis sahariennes.** [On the degree of continentalism of Tunisia and of the Saharan oases.] Tunis, **1925.** 8 p. chart, 5 equations. Reprint from: *Tunis, Service Botanique, Annales*, Fasc. 1, **1925. DWB**—Author applies his new method of calculating degree of "continentalism" as a function of temperature to Tunisia, where changes of degree of continentalism are so marked between desert and coastal regions. *Subject Headings:* **1. Continentality 2. Sahara Desert 3. Tunisia.**

3A–84 551.577:551.586:58(64)

Joleaud, L., **Le régime des pluies et les zones de végétation du Maroc.** [The rainfall regime and vegetation zones of Morocco.] *La Nature*, Paris, No. 2692:293 301, Nov. 1, **1925.** 11 figs., ref. **NNA**—Distribution of rainfall and resultant vegetation types described. Charts of rainfall and vegetation and some illustrative photographs included. *Subject Headings:* **1. Precipitation 2. Vegetation 3. Morocco.**

3A–85 551.589

Jury, A. and Dedebant, G., **Les types de temps au Maroc.** [Weather types in Morocco.] *France, Office National Météorologique, Memorial*, No. 13, **1925.** 44 p. 42 figs., map, refs. **NN**—Thorough, scientific analysis given of weather types and their causes in Morocco, well-illustrated by isobaric and isallobaric charts, charts of aerologic soundings, etc. Three principal weather types and their seasonal variations are considered in synoptic and aerologic detail, noting air-mass, frontal systems, prevailing wind conditions and other factors. *Subject Headings:* **1. Weather types 2. Morocco.**

3A–86 551.555.1:629.13

Lemoing, C., **Paris-Dakar par le Maroc; contribution à l'étude des alizés sur la côte marocaine.** [Paris-Dakar via Morocco; contribution to the study of the trades on the Moroccan coast.] *Société de Géographie du Maroc, Bulletin*, 4(4):45–54, **1925.** fold. map, 11 graphs, 2 tables. **NNA**—Flying conditions on different routes Paris-Dakar are briefly reviewed followed by more particular discussion of general wind direction along the northwest coast of Africa. Wind directions at different altitudes in different months at Casablanca are shown graphically. Tables give monthly wind direction

percentages. *Subject Headings:* **1. Aeronautical climatology 2. Trade winds 3. Paris-Dakar air route 4. Morocco.**

3A–87 551.515.8(6)

§Petitjean, Lucien, **La discontinuité nord-africaine.** [The North African discontinuity.] *La Météorologie*, 1:446–459, 1925. 8 charts, 2 refs. **DWB**—This particular line of discontinuity (polar front) along the Atlas Mountains of North Africa in summer is described, and a synoptic analysis is made including representative charts. The three phases in the life of such a discontinuity are noted. *Subject Headings:* **1. Fronts 2. Synoptic studies 3. Atlas Mountains 4. Northwest Africa.**

3A–88 551.577.3

Rychliński, Jean Paul, **Sur la variabilité des précipitations sous l'influence des continents et ses applications en Tunisie.** [On the variability of precipitation under the influence of the continents and its applications in Tunisia.] Tunis, 1925. 9 p. 4 tables. Reprint from: *Tunis, Service Botanique, Annales*, Fasc. 1, 1925. **DWB**—Continentality in general defined. Various degrees of it in Europe, Australia, South America and in Tunisia, where rain and temperature (pluviothermic) factors are of primary consideration, are discussed. *Subject Headings:* **1. Continentality 2. Precipitation 3. Australia 4. Europe 5. South America 6. Tunisia.**

3A–89 551.506:551.577.21(611)

*Tunis. Service Météorologique, **Pluviométrie agricole des années 1900–1901 à 1924–1925.** [Agricultural pluviometry for the years 1900–1901 to 1924–1925.] Tunis, [n.d.] 4 p. tables. Reprint from: **Statistiques du Service Météorologique Tunisien.** **DWB**—Tables are given, for numerous stations in Tunisia, of seasonal and annual rainfall means, calculated for five year periods between 1900–1925. *Subject Headings:* **1. Precipitation data 2. Tunisia.**

1926

3A–90 551.506.1(64)

*Rabat, Morocco. Institut Scientifique Chérifien, **Bulletin Météorologique.** Vol. 1, Feb.–Nov. 1926. **DWB**—Meteorological observations for Morocco for 1925–1926 are tabulated, discussed, charts constructed, etc. 1926 only year available. *Subject Headings:* **1. Climatic data 2. Morocco.**

3A–91 551.506(61)

***Osservazioni meteorologiche della Libia nel 1924; Ottobre-Dicembre.** [Meteorological observations of Libya in 1924; Oct.–Dec.] *Italy, Ministero delle Colonie, Bollettino d'Informazioni*, 14(1):54–62, Jan.–Feb. 1926. tables. **NN**—Climatic elements for 22 stations in Libya are tabulated for each of these four months in 1924. No discussion. *Subject Headings:* **1. Fragmentary climatic data 2. Libya.**

3A–92 551.582(65)

*Olufsen, Ole, **Mission O. Olufsen au Sahara, 1922 1923; le climat du Sahara; observations météorologiques.** [O. Olufsen mission to the Sahara 1922–1923; the climate of the Sahara; meteorological observations.] Copenhagen, 1926. 95 p. fold. map, photos, list of author's works. **NN**—Detailed map shows author's route through the Algerian Sahara. A descriptive discussion of the climate encountered accompanies the author's detailed meteorological journal which contains detailed observations (not tabulated). *Subject Headings:* **1. Climatology 2. Climatic data 3. Sahara Desert 4. Algeria.**

3A–93 551.509.311

Petitjean, Lucien, **La méthode norvégienne en Afrique du Nord.** [The Norwegian method in North Africa.] *La Météorologie*, 2:463–464, 1926. **DWB**—Brief note on weather forecasting in North Africa using the Norwegian method of analysis. *Subject Headings:* **1. Weather forecasting 2. Synoptic analysis 3. North Africa.**

1927

3A–94 551.577.2(64

*Dedebant, G. and Roche, G., **Note sur la nouvelle carte des pluies au Maroc.** [Note on the new rainfall chart of Morocco.] *La Météorologie*, 3:442–448, 1927. fig., chart, table. **DWB**—Includes chart of annual rainfall and tabulated monthly and annual rainfall normals for 56 stations for varying (3 to 43) numbers of years until 1926. *Subject Headings:* **1. Precipitation data 2. Morocco.**

3A–95 551.582(469.8)

de Menezes, Carolos A., **Breve noticia da ilha do Porto Santo e da sua meteorologia.** [Brief note on the island of Porto Santo and on its meteorology.] *Sociedade de Geografia de Lisboa, Boletim*, 45th Ser., No. 1-2:1–11, **1927.** 7 tables. **NNA**—Some early climatological observations, made on this small island near Madeira in about 1900–1902, are summarized in tables and discussed briefly. Values for temperature, pressure, relative humidity, vapor tension, cloud and precipitation are included. *Subject Headings:* **1. Climatology 2. Porto Santo, Madeira.**

3A–96 551.506.3:551.577.2(611)

*Ginestous, G., **Le régime des pluies en Tunisie pendant la période 1901–1925.** [Rainfall regime in Tunisia between 1901 and 1925.] Tunis, Service Météorologique, **1927.** 225 p. 59 figs., 5 charts, numerous tables. **NNA, DWB**—Rainfall observations from numerous stations in Tunisia for 25 years are analyzed at length. Characteristics, means, variations, etc. are determined for 17 regional divisions of Tunisia. Illustrative charts and maps and extensive tables are included. *Also:* same author, similar title, but for period 1901–1930. *Tunis, Direction Générale de l'Agriculture, du Commerce et de la Colonisation, Bulletin*, 4e trim., 1931. 16 p. maps (folded). Unchecked. *Subject Headings:* **1. Precipitation 2. Long period records 3. Tunisia.**

3A–97 551.509.33:551.577.33

Petitjean, Lucien, **Sur une périodicité et une symétrie de la courbe des pluies à Alger. Application à la prévision des périodes sèches et pluvieuses en Algérie.** [On a periodicity and a symmetry of the rain curve at Algiers. Application to the forecasting of dry and rainy periods in Algeria.] *Académie des Sciences, Paris, Comptes Rendus*, 185:472–473, **1927.** Also: **Sur la prévision des périodes sèches et pluvieuses en Algérie.** [On the forecasting of dry and rainy periods in Algeria.] *Ibid.*, 226:194–195, 1948. **DWB**—The first note describes periodicities of 6, 15 and 35 years in rainfall of Algiers, giving a symmetry point in 1903, from which rainfall is forecast up to 1975. The second note gives precise dates of maxima and minima; the next maximum is forecast for 1952. (*Same abstract* as No. 2B–67 in Feb. 1950 *Meteorological Abstracts.*) *Subject Headings:* **1. Long range forecasting 2. Periodicities 3. Symmetry points 4. Algeria.**—*C.E.P.B.*

3A–98 551.506.1(64)

*Rabat, Morocco. Institut Scientifique Chérifien, **Pluies . . . et températures moyennes mensuelles.** [Rainfall . . . and temperature, monthly means.] *Rabat, Morocco, Institut Scientifique Chérifien, Bulletin Officiel*, No. 749:437–438, March 1, **1927.** 2 tables. Photostat. **DWB**—Monthly means are tabulated, calculated from observations for numerous stations of Morocco kept for periods of from five to 43 years. *Subject Headings:* **1. Precipitation 2. Temperature 3. Climatic data 4. Morocco.**

1928

3A–99 551.571

Ginestous, G., **La richesse en vapeur d'eau de l'atmosphère dans le sud tunisien.** [Amount of water vapor in the atmosphere in southern Tunisia.] Extract from: *Tunis, Direction Générale de l'Agriculture, du Commerce et de la Colonisation, Bulletin*, 3rd trimestre, **1928.** 8 p. 4 tables. **DWB**—Work is a reprint from a study on "aridity index" and the application to climatology in Tunisia of a new formula by DE MARTONNE. Tables give values of water vapor in the air at six Tunisian locations. *Subject Headings:* **1. Water vapor 2. Tunisia.**

3A–100 551.583.2

†Gribaudi, Dino, **Sono mutate in epoca storica le condizioni climatiche della Libia?** [Have climatic conditions in Libya changed in historic time?] (*R.*) *Società Geografica Italiana, Bollettino*, 6th Ser., 5(3–4):171–213, **1928.** numerous refs. **NNA**—Various references to climate in different historical periods are given and discussed. *Subject Headings:* **1. Historical climates 2. Libya.**

3A–101 551.515.1(661)

Petitjean, Lucien, **La dépression saharienne.** [The Saharan depression.] *La Météorologie*, 4:145–154, **1928.** 2 figs., refs. **DWB**—Synoptic analysis is made of the Sahara depression, the air masses and fronts involved, fog and precipitation before and after its passage, and other accompanying meteorological conditions. *Subject Headings:* **1. Atmospheric disturbances 2. Sahara Desert.**

3A–102 551.506.1(612,614)

***Riassunto delle osservazioni meteorologiche eseguite nella Tripolitania nell'anno 1926.** [Summary of the meteorological observations made in Tripolitania in 1926.] *Rassegna Economica delle Colonie*, 16(9–10):848–867, Sept.–Oct. **1928.** extensive tables. **NNA**—Monthly values of the usual climatological elements are tabulated for numerous stations of Tripolitania. Similar observations

U. OF I.
LIBRARY

for Cyrenaica appear on the following pages, 868–877. *Subject Headings:* **1. Climatic data 2. Tripolitania 3. Cyrenaica.**

3A–103 551.521.1

*Tunis. Service Botanique, **Mesure du rayonnement solaire au Service Botanique de Tunisie.** [Measurement of solar radiation by the Botanical Service of Tunisia.] *Tunis, Service Botanique, Annales*, 5(2):1–222, **1928.** numerous figs., tables. **NNA**—The entire number of this periodical is devoted to articles summing up the instrumental and observational set-up as well as the actual observations of the actinometric station of the Service Botanique at Ariana near Tunis. Individual articles by author and title are as follows:

I. Boeuf, F., **Station actinométrique du Service Botanique.** [Actinometric stations of the Botanical Service.]

II. Gorczyński, W., **Instruments solarimétriques et spectropyrhéliométriques pour les mesures totales, normales et partielles du rayonnement solaire.** [Solarimetric and spectropyrheliometric instruments for total, normal and partial measurements of solar radiation.]

III. —, **Quelques résultats d'étalonnage des tubes pyrhéliométriques, des pyrhéliographes et des solarimètres.** [Some results of the standardization of pyrheliometric tubes, of pyrheliographs and of solarimeters.]

IV. Boeuf, F., **Climat solaire théorique sous la latitude 36°49′N.** [Theoretical solar climate at lat. 36°49′N.]

V. Amiable, J.-V., **Formules et tables pour calculs actinométriques.** [Formulas and tables for actinometric calculations.]

VI. —, **Valeur des l'intensité du rayonnement solaire obtenues de 1924 à 1927 à l'Ariana pour l'incidence normale.** [Values of the intensity of solar radiation obtained from 1924 to 1927 at Ariana for normal incidence.]

VII. Gorczyński, W., **Quelques traits caractéristiques du climat solaire réel du littoral tunisien d'après les enrégistrements des pyrhéliographes thermo-électriques du Service Botanique de Tunisie pendant les années 1924 à 1927.** [Some characteristic traits of the actual solar climate of coastal Tunisia from records of some thermoelectric pyrheliographs of the Botanic Service of Tunisia during the years 1924 to 1927.] *Subject Headings:* **1. Solar radiation 2. Radiation instruments 3. Tunisia. I. Boeuf, F. II. Gorczyńsky, Władislaw III. Amiable, J.—V.**

3A–104 551.582:63(612)

*Wittschell, Leo, **Klima und Landschaft in Tripolitanien.** [Climate and landscape in Tripolitania.] *Königsberg, Universität, Geographisches Institut, Veröffentlichungen*, No. 10, **1928.** 50 p., 8 charts, 18 figs., tables. **NN**—Physical characteristics of Tripolitania are noted, then the climatic factors: general characteristics and causes and the individual elements, including tables of mean values for short periods. Climatic and agricultural regions are determined and compared. Types of vegetation, soil, physiographic features in each, noted. Charts show temperature and precipitation conditions as well as geological and agricultural regions. *Subject Headings:* **1. Agricultura climatology 2. Tripolitania.**

1929

3A–105 551.583

Bovill, E. W., **The Sahara.** *Antiquity*, 3(12):414–423, **1929.** 26 refs. **NNA**—Evidences of climatic change during historic time are discussed and refuted. Numerous references are made to other discussions of the question. Author charges any increase of aridity to human neglect rather than to a progressive climatic change. *Subject Headings:* **1. Climatic changes 2. Sahara Desert.**

3A–106 551.506.5(66

*Brooks, Charles E. P. and Mirrlees, S. T. A., **The meteorological results of journeys in the Southern Sahara made by Francis Rodd in 1922 1927.** *Great Britain, Meteorological Office, Geophysical Memoirs*, No. 48, **1929.** 40 p. map, 6 figs., 25 tables, refs., appends. **NN**—Meteorological data collected in the south central Sahara, 1922 and 1927, are discussed, including general characteristics of climate, instruments and methods of observation, pressure, temperature, humidity, winds, cloud, rain and other phenomena, and visibility. The appendix reproduces the "Meteorological diaries kept by F. R. Rodd, 1922 and 1927." *Subject Headings:* **1. Climatic data 2. Climatology 3. Sahara Desert. I. Rodd, Francis R.**

3A–107 551.582.1(614

Fântoli, Amilcare, **Il clima della Cirenaica.** [The climate of Cyrenaica.] *Cyrenaica, Camera di Commercio, Notiziario Economicio*, 2(3):31–37, May–June **1929.** **NNA**—General descriptive account of climatic conditions and zones. *Subject Headings:* **1. Climatology 2. Cyrenaica.**

3A–108 551.582(612)

Fàntoli, Amilcare, **Il clima della Tripolitania.** [The climate of Tripolitania.] *Rivista delle Colonie Italiane*, Rome, 3(4):374–386, April **1929.** figs., ref. **NNA**—Descriptive account of climate in the various regions of Tripolitania. Map shows the regions. Diagrams show comparisons of precipitation and relative humidity at several stations; others show temperature maxima and minima. *Subject Headings:* **1. Climatology 2. Tripolitania.**

3A–109 551.521.12

Gorczyński, Władysław, **Quelques résultats de mesures de l'intensité du rayonnement solaire obtenus au Sahara en 1924–26 avec les pyrheliomètres et les solarimètres.** [Some results of solar radiation intensity measurements made in the Sahara in 1924–1926 with pyrheliometers and solarimeters.] *La Météorologie*, 5:1–13, **1929.** 5 tables, refs. **DWB**—Diurnal maxima of solar radiation intensity observed at Oasis of Ouargla (1926) and at Ariana (1924–1926) are tabulated briefly and discussed. General comparisons are made between solar radiation in the Sahara and on the coasts of Africa and Europe. *Subject Headings:* **1. Solar radiation 2. Sahara Desert.**

3A–110 551.582(65)

*Lasserre, —, **Aperçu météorologique.** [Meteorological sketch.] (In: Algeria. Direction des Territoires du Sud, **Les Territoires du Sud de l'Algérie.** Pt. I. **1929.** p. 175–262. 2 charts, 50 tables.) **NNA**—Climatological summary of the Algerian Sahara given, based on observations from 24 stations; however, the stations then were in such a loose network that meteorological conclusions could only be rather vague. Tables give observations of climatological elements for different periods of time at various stations. *Subject Headings:* **1. Climatology 2. Climatic data 3. Sahara Desert 4. Algeria I. Algeria. Direction des Territoires du Sud.**

3A–111 551.557:629.13(65)

Petitjean, Lucien, **Dix années de sondages à Alger.** [Ten years of soundings at Algiers.] *La Météorologie*, 5:214–237, **1929.** 14 figs., refs. **DWB**—Author condenses into graphic form statistical results of wind speed and direction from ten years' soundings over Algiers; he attempts to relate these results to the further study of dynamic meteorology and shows how the graphs obtained can be utilized in aerial navigation. *Subject Headings:* **1. Upper air winds 2. Aeronautical climatology 3. Algiers, Algeria.**

3A–112 551.582(61)

†Reahder, Lucie, **Grundlagen und Versuch einer landschaftskundlichen Gliederung der nördlichen algerischen Sahara.** [Groundwork and an attempt at a landscape classification system for the northern Algerian Sahara.] *Aus dem Archiv der Deutschen Seewarte*, Hamburg, 48(2), **1929.** 64 p. 11 figs., 4 tables, biblio. p. 62–64. **DLC**—On the basis of present geological features, the subject area is divided into six distinct regions. A description of the present day climate is given and reference made to possible large climatic changes in the past. Other main topics discussed in the monograph are rock structure, soil, hydrography, vegetation and local illnesses. Meteorological data tables, pressure charts, and an extensive regional bibliography are included. *Subject Headings:* **1. Climatology 2. Sahara Desert 3. North Africa.**—*M.P.K.*

1930

3A–113 551.583

Dessoliers, Hippolyte, **Refoulement du Sahara.** [Reclamation of the Sahara.] Pt. 1, 2nd ed. Algiers, **1930.** 158 p. map, 2 graphs, refs. **NNA**—In a fairly extensive and detailed treatise, author describes the climatic conditions and drawbacks of the Sahara, the geographical and meteorological causes of the desert and climatic change and drying up of the earth in general. He seeks to present theories and schemes by which man, through better understanding of the dynamics and processes of the atmosphere, can learn to control weather and thereby prevent the waste of this vast desert region. *Subject Headings:* **1. Aridity 2. Climatology 3. Climatic changes 4. Weather control 5. Sahara Desert.**

3A–114 551.509.67

Dubuc, E., **Les pluies artificielles par le procédé Dessoliers.** [Artificial rainfall by the Dessoliers process.] *La Géographie*, Paris, 53(1–2):39–43, Jan.–Feb. **1930.** **NNA**—Rain producing scheme of DESSOLIERS is explained, based on theory of the tropical atolls of the Pacific where water evaporates from the central lagoon and causes cloud and rain over the island. He would apply scheme to the Barbary Coast, North Africa, to insure rainfall by reconstructing physical conditions similar to the atolls in the small lakes left by the winter rains in hilly regions of the Barbary Coast around which agricultural areas would develop. Problem of the dryness of the North African air is considered. *Subject Headings:* **1. Artificial precipitation 2. North Africa.**

3A–115 551.586:63

Fàntoli, Amilcare, **L'ambiente agro-meteorologico del Fezzan.** [Agro-meteorological conditions at Fezzan.] Rome, Istituto Poligrafico dello Stato, **1930.** 13 p. Reprint from: *Rassegna Economica delle Colonie*, No. 5–6, **1930. NNA**—Climate and agricultural conditions in this region of deserts and oases in SW Libya are described. No data given. *Subject Headings:* **1. Agricultural climatology 2. Fezzan, Libya.**

3A–116 551.577.2

Fàntoli, Amilcare, **Le grandi linee della distribuzione pluviometrica in Libia e nelle sue regioni adiacenti.** [The principle features of the rainfall distribution in Libya and in its adjacent regions.] *Rivista delle Colonie Italiane*, Rome, 4(12):1103–1111, Dec. **1930.** 4 photos. **NNA**—Also in: *XI Congresso Geografico Italiano, Atti*, Naples, 3:177–184, **1930. NNA**—General features of rainfall are noted such as limited period of occurrence, infrequency, extreme irregularity, regional variations, etc., in a descriptive type article with photos taken after heavy rains. No data. *Subject Headings:* **1. Precipitation 2. Libya.**

3A–117 551.582.3(612,614)

Italy. Ministero delle Colonie, Servizio Cartografico, **Atlante meteorologico della Libia.** [Meteorological atlas of Libya.] Rome, **1930.** 35 p. 23 maps, photos, 6 refs. **NNA**—In Pt. 1 (text) the stations in the meteorological network of Tripolitania and Cyrenaica are listed; climatic zones are defined; temperature, precipitation and winds are discussed. Pt. 2 consists of photographs. Pt. 3, of charts. Climatic zones, annual and seasonal isotherms and isohyets and seasonal wind directions are charted. No tables. *Subject Headings:* **1. Climatology 2. Atlases 3. Tripolitania 4. Cyrenaica.**

3A–118 551.582(65)

Lasserre, —, **Climatologie et météorologie.** [Climatology and meteorology.] (In: Algeria. Direction des Territoires du Sud, **Les Territoires du Sud de l'Algérie.** Pt. 5, **1930.** p. 63–79.) **NNA, DLC**—Descriptive account given of development of a meteorological network in the Sahara, problems, stations, observers, plans, etc. *Subject Headings:* **1. Meteorological services 2. Climatology 3. Sahara Desert 4. Algeria. I. Algeria. Direction des Terriroires du Sud.**

3A–119 551.593(612)

Mazzarelli, Gustavo, **Alcuni fenomeni ottici atmosferici osservati in Tripolitania.** [Some atmospheric optical phenomena observed in Tripolitania.] *Messina, (R.) Università, Istituto di Geografia, Memorie*, No. 2, **1930.** 4 p. 6 figs. **NNA**—Brief discussion and small pictures given of various optical phenomena noted in 1925 and 1927 along the sea coast of Tripolitania. *Subject Headings:* **1. Optical phenomena 2. Tripolitania.**

3A–120 551.509:551.582(8)

§Petitjean, Lucien, **Le temps et la prévision du temps en Algerie et au Sahara.** [The weather and weather forecasting in Algeria and the Sahara.] Paris, **1930.** 70 p. 4 figs., 8 charts, 25 refs. **DLC**—Detailed study of weather phenomena made as applied to conditions and forecasting in northwest Africa. Author summarizes the predominant weather factors: general atmospheric circulation, fronts and centers of action, atmospheric disturbances, depressions, attending winds, clouds and their influence on the various weather factors of Algeria and the Sahara. In the second part he establishes forecasting rules for the region in general and applies them to a synoptic study of the situation April 1–4, 1929. Synoptic charts are included. *Subject Headings:* **1. Synoptic studies 2. Weather forecasting 3. Climatology 4. Algeria 5. Sahara Desert 6. Northwest Africa.**

3A–121 551.582.2

†*von Ficker, Heinrich, **Die meteorologischen Verhältnisse der Insel Teneriffa.** [Meteorological conditions of Tenerife Island.] *Preussische Akademie der Wissenschaften, Berlin, Phys.-Math. Klasse, Abhandlungen*, No. 1, **1930.** 105 p. 15 figs., 37+tables, 45 refs., append. **NNA**—Author summarizes thoroughly all his previous observations and discussions of the meteorological elements of Tenerife included in his list of references. He takes up in detail: atmospheric pressure, relations between stations, yearly regimes, variations, etc.; wind conditions, directions, distribution, upper air observations, speeds; temperature conditions, monthly and annual means, extremes, variations with height, etc.; absolute and relative humidity; cloud amount and type, fog, haze; precipitation means, variations, amounts; normal weather disturbances. Climatic tables are appended for individual stations. *Subject Headings:* **1. Climatology 2. Tenerife, Canary Islands.**

1931

3A–122 551.582

Crestani, Giuseppe, **Climatologia.** [Climatology.] Torino, **1931.** 359 p. tables, refs. **DWB**—Section on Libya p. 333–341, on Eritrea and Somaliland p. 341–349. General descriptive account of climates, by regions, of each of the usual elements individually, and of climatic subdivisions of the region, supplemented by brief summarized data. *Subject Headings:* **1. Climatology 2. Libya 3. Eritrea 4. Somaliland.**

3A–123 551.506.1(614)

*Cyrenaica. Ufficio Meteorologico, **Bollettino Meteorologico della Cirenaica . . . 1924–1931.** extensive tables. **NN**—Continued as: *Italy, Ministero delle Colonie, Bolletino Meteorologico delle Colonie Italiane, 2nd Ser.* (*See item* 3A–181.) **NNA, DWB**—Detailed observations for each year at official meteorological stations are recorded at length. *Subject Headings:* **1. Climatic data 2. Cyrenaica.**

3A–124 551.586:63

†Fântoli, Amilcare, **Gli studi agro-meteorologici in Libia.** [Study of agricultural meteorology in Libya.] *Rassegna Economica delle Colonie,* 19(7–8):893–906, July–Aug. **1931.** 30 refs. **NNA**—Problems and adaptations of agriculture in relation to climate in Libya are discussed at length. Numerous pertinent agricultural and some climatic references are cited, but no data reproduced. *Subject Headings:* **1. Agricultural climatology 2. Libya.**

3A–125 551.583.2

†Fântoli, Amilcare, **Le notizie meteorologiche sulla Tripolitania e Cirenaica nell'antichità.** [Meteorological notes on Tripolitania and Cyrenaica in antiquity.] *Rivista delle Colonie Italiane,* 5(8):638–646, Aug. **1931.** 8 photos. **NNA**—Discussion of climate as it must have been in ancient times using numerous references to writings of ARISTOTLE, PLINY, HERODOTUS, etc. *Subject Headings:* **1. Historical climates 2. Tripolitania 3. Cyrenaica.**

3A–126 551.582(64)

*Rouch, Jules Alfred Pierre, **Le Maroc maritime français; notice météorologique et océanographique.** [Maritime French Morocco; meteorological and oceanographical note.] *Société des Sciences Naturelles du Maroc, Memoires,* No. 28, Nov. 30, **1931.** 21 p. tables, 9 refs. **NN**—Climatic elements along the coast of Morocco are described, and values are tabulated for different places. Then the currents, tides and swells of the bordering sea are discussed briefly. *Subject Headings:* **1. Climatology 2. Climatic data 3. Oceanography 4. Moroccan Coast.**

3A–127 551.506.1(612)

*Tripolitania. Ufficio Meteorologico, **Bolletino Meteorologico della Tripolitania . . . 1919–1931.** maps, extensive tables. Title varies. **NN, DWB.** Continued as: *Italy, Ministero delle Colonie, Bollettino Meteorologico delle Colonie Italiane, 2nd Ser.,* 1932, 1933. (*See item* 3A–181.) **NNA, DWB**—Detailed meteorological observations for all official stations in Tripolitania are tabulated each year. *Subject Headings:* **1. Climatic data 2. Tripolitania.**

1932

3A–128 551.556.4:551.311.31

Aufrère, L., **Morphologie dunaire et météorologie saharienne.** [Dune morphology and Saharan meteorology.] *Association de Géographes Français, Bulletin,* No. 56:34–48, Feb. **1932.** 4 figs., 3 refs. **DLC, NNA**—Directions and shapes of dunes of the Sahara are studied with the purpose of determining geological and meteorological causes, principally wind direction and force. *Subject Headings:* **1. Winds 2. Morphology 3. Sand dunes 4. Sahara Desert.**

3A–129 551.582(53,661)

*Brooks, Charles E. P., **Le climat du Sahara et de l'Arabie.** [The climate of the Sahara and of Arabia.] Paris, Société d'Editions Géographique, Maritimes et Coloniales, **1932.** 81 p. 17 figs., 11 tables, refs. Introduction by MASAUJI HACHISUKA p. 1–23. **NNA**—Deserts in general are defined, then particular features of the Sahara and Arabia are discussed: barometric pressure and winds (with maps showing seasonal wind directions and isobars); storms and disturbances, dust devils, haboobs, harmattan, etc.; rainfall and clouds; temperature means, diurnal and annual variations, distribution, etc.; humidity, visibility, mirages, dew; geologic climatic changes and those during historic times. (*Same item* as No. 2F–96 in June 1951 *Meteorological Abstracts.*) *Subject Headings:* **1. Climatology 2. Climatic changes 3. Climatic data 4. Sahara Desert 5. Arabia. I. Hachisuka, Masauji.**

3A–130 551.557(261)

*Eckardt, B. and Lühe, P., **Ergebnisse von Höhenwindmessungen auf dem Ostatlantischen Ozean längs der westafrikanischen Küste im Januar und Februar 1929.** [Results of upper air wind measurements over the eastern Atlantic Ocean along the west African coast in January and February 1929.] *Aus dem Archiv der Deutschen Seewarte*. Hamburg, 51(1), 1932. 30 p. 7 fold. plates. 8 tables. refs. **NN**—Observations made from shipboard on this trip along the NW African coast are reported in detail, tabulated and analyzed. Velocities and frequencies at different heights at different latitudes are noted as well as air and water temperatures, humidity and cloud conditions. (*See also item* 3A–135. *Subject Headings:* **1. Upper air winds 2. Upper air data 3. Northwest African Coast.**

3A–131 551.586:612

Fàntoli, Amilcare. **L'ambiente fisico delle colonie libiche nei suoi riflessi demografici e nelle sue influenze sul lavor indigeno.** [The effect of physical environment of the colony of Libya upon population and native labor.] *Rassegna Economica delle Colonie*. 20:5–6:597–613. May–June 1932. map, diagr., 3 tables. 16 refs. mostly medical in nature. **NNA**—Climatic regions of Libya are defined and shown on map. Mean monthly values of temperature and humidity are given for a station in each climatic region of Tripolitania and Cyrenaica. Climograms are constructed for 11 towns of the colony. Types of populations, nomadic or permanent, and livelihood in each region are noted. *Subject Headings:* **1. Climatology 2. Human activity 3. Libya.**

3A–132 551.582:016

†Fàntoli, Amilcare. **Bibliografia meteorologica delle colonie italiane e delle isole italiane dell'Egeo.** [Meteorological bibliography of the Italian colonies and of the Italian islands of the Aegean.] *Rassegna Economica delle Colonie*. 20:7–8:779–792. **1932.** extensive refs. **NNA**—List is largely the same as that in *ibid.*, 17:9–10:979–988, Sept.–Oct. 1929, in which about 200 references going back to 1802 are arranged alphabetically for each region. Tripolitania and Cyrenaica, with no annotations. However, the 1932 list includes references to other Italian colonies as well and a few more recent articles. *Subject Headings:* **1. Climatology 2. Bibliographies 3. Tripolitania 4. Cyrenaica 5. Italian East Africa 6. Italian Aegean Islands.**

3A–133 551.524.2

Fàntoli, Amilcare. **Medie temperature stagionali di alcune località libiche e sahariane.** [Seasonal temperature means of some Libyan and Saharan localities.] *Rassegna Economica delle Colonie*. 20:1042–1043. Sept.–Oct. 1932. 4 fold. maps. **NNA**—Maps show temperature means over the Sahara region of Libya, Algeria and Egypt for each season. *Subject Headings:* **1. Temperature 2. Sahara Desert 3. Libya 4. Algeria 5. Egypt.**

3A–134 551.577.2

Fàntoli, Amilcare. **Quarant' anni di piogge in Libia.** [Forty years of rainfall in Libya.] *Bollettino Geografico, Cyrenaico*. No. 2:71–78. Jan.–June 1932. fold. diagr. **NNA**—Diagram compares rainfall amounts for Tripoli and Bengasi, 1892–1932, accompanied by brief discussion in text. *Subject Headings:* **1. Precipitation 2. Tripoli, Libya 3. Bengasi, Libya.**

3A–135 551.557

*Geiger, Rudolf and Wagner, Fritz. **Hohenwinde vor der westafrikanischen Küste im Herbst.** [Upper air winds over the west African coast in autumn.] *Aus dem Archiv der Deutschen Seewarte*. Hamburg, 51(2), 1932. 63 p. 12 figs. 4 fold. plates, 4 extensive tables. refs. **NN**—Detailed and thorough analysis of wind conditions, directions, frequencies and velocities at different heights along the coast of NW Africa, using and including extensive observational data kept from shipboard during a scientific journey Sept.–Nov. 1930. (*See also item* 3A–130.) *Subject Headings:* **1. Upper air winds 2. Northwest African Coast.**

3A–136 551.515.8:551.509:318(8)

§Petitjean, Julien. **La frontologie en Afrique du Nord.** [Frontology in North Africa.] *Beiträge zur Physik der freien Atmosphäre*. 19:168–172. 1932. 8 charts, 3 refs. **NN**—Cyclonic and anticyclonic air masses, their characteristics, fronts, and movements in northwest Africa are studied and results are applied to forecasting particular kinds of atmospheric disturbances. *Subject Headings:* **1. Fronts 2. Air masses 3. Weather forecasting 4. Northwest Africa.**

3A–137 551.509.2 (64

*§Rabat, Morocco. Institut Scientifique Chérifien, Service de Physique du Globe et de Météorologie. **Bulletin Météorologique Marocain.** 4[1] Vols. Oct. 1922–Dec. 1932. Title varies slightly

DWB—Official bulletin, containing daily synoptic charts and observational data. *Subject Headings:* 1. **Observational data 2. Synoptic charts 3. Morocco.**

3A–138 551.506.1(611)

*Tunis. Service Météorologique. [**Report**] . . . 1921–1932. Tunis, [n. d.] DWB—Observational data for the various climatic elements for numerous Tunisian stations are tabulated in detail including aerological soundings. *Subject Headings:* 1. **Climatic data 2. Upper air data 3. Tunisia.**

1933

3A–139 551.521

Büttner, K., **Einige Strahlungsmessungen in der tripolitanischen Sahara.** [Some radiation measurements in the Tripolitanian Sahara.] *Meteorologische Zeitschrift*, 50:112, 489–493, **1933.** 3 figs., 8 refs., equations. **NN**—Author reports the results of his trip into the Sahara in 1933; describes apparatus, weather conditions (including a sandstorm) and temperature and radiation measurements and calculations. Sunset observations were made to determine clarity of the atmosphere. Atmospheric transmissibility, absorption, ultraviolet radiation and turbidity factor are briefly noted. Measurements are graphically illustrated rather than tabulated. *Subject Headings:* 1. **Radiation 2. Sahara Desert 3. Tripolitania.**

3A–140 551.577.3:551.590.21

Fàntoli, Amilcare, **Se esista una relazione fra il ciclo undicennale dell'attivita solare e le pioggie in Libia.** [There exists a relation between the eleven year cycle of solar activity and rainfall in Libya.] *Bollettino Geografico*, Cyrenaica, No. 4:50–65, Jan./June **1933.** 4 fold. graphs, table, refs., equations. **NNA**—Graphs and table, using sunspot and precipitation data from 1880–1932 in Tripoli and Bengasi, are constructed and discussed, and correlations are found. *Subject Headings:* 1. **Precipitation 2. Sunspots 3. Libya.**

3A–141 551.582(64,65,611)

*§Rouch, Jules Alfred Pierre, **Notice météorologique sur les côtes de France et d'Afrique du Nord.** Météorological note on the coasts of France and of North Africa.] 2nd ed. France, Service Hydrographique, 1933. 192 p., 40 figs., numerous tables. **NNA**—Discussions of the climate of the coasts of Algeria, Morocco and Tunisia are included. General characteristics of climates are noted with particular attention to types of weather, frequencies of depressions, forecasting, etc. Values for climatic elements at various stations are tabulated at length. *Subject Headings:* 1. **Climatology 2. Climatic data 3. Morocco 4. Algeria 5. Tunisia.**

1934

3A–142 551.582(612)

*Ayra, Giuseppe, **Tripoli e il suo clima.** [Tripoli and its climate.] Torino [1934]. 103 p., 5 tables. **NN**—Section on climate, including meteorological tables for 1892–1895, p. 47–79. Atmospheric pressure, temperature, relative humidity and vapor pressure, winds and precipitation are discussed as part of a general survey of Tripoli. *Subject Headings:* 1. **Climatology 2. Tripoli, Libya.**

3A–143 551.555.3

§Bidault, G., **Les vents chauds au Maroc.** [Hot winds of Morocco.] *Association Française pour l'Avancement des Sciences, Compte Rendu*, 58:81–85, 1934. 3 figs., 3 refs. **DLC, NN**—Two types of these hot winds between March and October are distinguished, along with their causative weather types and three small synoptic-type charts. *Subject Headings:* 1. **Winds 2. Morocco.**

3A–144 551.524.37

§Debrach, J. and Bidault, G., **Les gelées nocturnes sur le littoral marocain.** [Night frosts on the Moroccan seacoast.] *Association Française pour l'Avancement des Sciences, Compte Rendu*, 58:88–97, 1934. 2 figs., 4 tables, 8 refs. **NN**—General discussion of frosts during night in Morocco includes consideration of nocturnal cooling, influence of cloud cover and air temperature and humidity conditions, forecasting of low temperatures, and the influence of the general synoptic situations, several of which are illustrated. Tables give means and frequencies of temperature minima at Casablanca for the last 10 years. *Subject Headings:* 1. **Frost 2. Morocco.**

3A–145 551.521.12(64)

Debrach, J., **Premières observations actinométriques effectuées au Maroc.** [First actinometric observations made at Morocco.] *Association Française pour l'Avancement des Sciences, Compte Rendu*, 58:97–100, 1934. 2 tables. **NN**—Brief resume of methods and first year's 1933–1934 actinometric observations at Casablanca. Brief tables give hourly values for six dates, and monthly minima, Nov.–March. *Subject Headings:* 1. **Solar radiation 2. Morocco.**

3A–146 551.582(64) 551.586(64)

Emberger, Louis and Maire, R., **Tableau phytogéographique du Maroc.** [Phytogeographic sketch of Morocco.] *Société des Sciences Naturelles du Maroc, Mémoires*, No. 38, May **1934.** 187 p. 16 figs., tables, refs. **NNM**—A thorough exposition on Moroccan climate (p. 30–171). Each element is analyzed in turn. Contents include chapters on: wind —regional and seasonal variations with frequency-velocity tables for numerous stations from about 5 years observations; rainfall and snow—seasonal and regional distribution, precipitation zones, tables of means, variations, days of rain, and snow conditions in the various mountain regions; radiation and temperature—principally the latter—annual monthly and seasonal means and variations, and frosts; and humidity and evaporation—including consideration of relative humidity, vapor pressure, cloud, fog and mist, saturation deficit, and some evaporation discussion and data. Effects of each element on vegetation conditions are considered; summarized data, diagrams, and numerous references in footnotes are included. Finally, a theoretical "climatic synthesis" is given. The last chapter of the work, p. 171–187, deals with soil conditions of Morocco. *Subject Headings:* **1. Climatology 2. Plant ecology 3. Morocco.**

3A–147 551.577.2(64)

*Emberger, Louis and Roux, Georges, **Une nouvelle carte des pluies du Maroc.** [A new rainfall chart of Morocco.] *La Météorologie*, 10:491–499, **1934.** fold. chart, 2 figs., 2 tables. **NN**—Rainfall observations, 1922–1932, for 23 stations of Morocco are summarized in tables and discussed. A rainfall map is constructed and analyzed. **Carte des pluies du Maroc.** By LOUIS EMBERGER. Rabat, 1933. Large folded map available at **DWB.** *Subject Headings:* **1. Precipitation 2. Morocco.**

3A–148 551.577.2(61)

*Fàntoli, Amilcare, **Le pioggie della città di Tripoli.** [Rainfall of the city of Tripoli.] *Italy (R.) Uffizio per i Servizi Agrari, Bollettino*, 3(11), **1934.** 12 p. diagr., tables, 4 refs. Reprint. **DWB**—Rainfall data for the city, 1879–1934, are summarized in tables and discussed. Diagram shows variation in annual totals. *Subject Headings:* **1. Precipitation 2. Long period records 3. Tripoli, Libya.**

3A–149 551.577.2(612)

Fàntoli, Amilcare, **Il significato delle medie nei reguardi delle pioggie in Libia.** [The significance of means with regard to rainfall in Libya.] *Agricoltura Coloniale*, Florence, 28:12:634–640, Dec. **1934.** graph, ref. **NNA**—Comparative study of long-period rainfall observations of Tripoli, Bengasi, and other coastal points of Libya is made. *Subject Headings:* **1. Precipitation 2. Libya.**

3A–150 551.582.2(612)

Fàntoli, Amilcare, **La zona degli altipiani nord-orientali della Tripolitania; sguardo climatologico.** [The zone of the northeastern high plateau of Tripolitania; climatological survey.] *Bollettino Geografico*, Cyrenaica, No. 5–6:57–72, **1933–1934.** diagr., small tables, 5 refs. **NNA**—Climatological elements of this region near the coast are discussed, and some values for 1921–1931 are tabulated briefly for Tarhuna and El-Gusbàt. *Subject Headings:* **1. Climatology 2. Tripolitania.**

3A–151 551.501.

Flammarion, Gabrielle Camille, **L'Observatoire du Hoggar à Tamanrasset.** [The observatory of Hoggar at Tamanrasset.] *L'Illustration*, 92:54–55, May 12, **1934.** 8 photos, map. **NNA**—Popular descriptive account, giving brief history and illustrations of the observatory. No data. *Subject Headings:* **1. Observatories 2. Tamanrasset, Algeria, Observatoire Jules Carde 3. Hoggar, Algeria.**

3A–152 551.582(612)

Kanter, H., **Wetterbeobachtungen aus Libyen Tripolitanien.** [Weather observations in Libya (Tripolitania).] *Annalen der Hydrographie und Maritimen Meteorologie*, 62:80–82, **1934. NNA**—Brief but detailed description of weather conditions during a dust storm on the desert between 30° and 31°N., 13°E. *Subject Headings:* **1. Weather 2. Dust storms 2. Tripolitania.**

3A–153 551.54

Perret, R., **Sur l'existence d'une aire de hautes pressions, en hiver, dans le Sahara central.** [On the existence of high pressure regions, in winter, in the central Sahara.] *Association de Géographes Français, Bulletin*, No. 83:127–129, Dec. **1934.** 2 figs. **NNA**—Author states that climatic regime of the Sahara is more complicated than thought by C. E. P. BROOKS and earlier meteorologists; he explains briefly why he believes the south winds of the desert are caused by Sahara depressions as well as by Mediterranean depressions. Figures show pressure and wind conditions over Sahara in July and in Jan. *Subject Headings:* **1. Atmospheric pressure 2. Climatology 3. Sahara Desert.**

3A–154 551.510.42:551.555.8

Semmelhack, W., **Die Staubfälle im nordwest-afrikanischen Gebiet des Atlantischen Ozeans. Zugleich Beitrag zur "Harmattan"-Kunde.** [Dust falls in the northwest African region of the Atlantic Ocean; together with a contribution to the knowledge of harmattan.] *Annalen der Hydrographie und Maritimen Meteorologie*, 62:273–277, **1934.** 3 figs., plate, 2 tables, refs. **NNA**—Frequency of dustfall off the coast by month is determined and discussed as to prevailing winds, the harmattan, trades, etc., amount of precipitation and the location of desert areas. *Subject Headings:* **1. Dust falls 2. Atmospheric pollution 3. Harmattan 4. Northwest African Coast.**

3A–155 551.506.7

*Spain. Servicio Meteorológico Nacional, **Resúmen de las Observaciones Aerológicas . . . 1932, 1934.** charts, tables. **DLC**—Includes daily pilot balloon observations for observatories at Izaña and Santa Cruz de Tenerife in the Canary Islands, as well as for numerous stations of Spain (and tephigrams, for Madrid only). *Subject Headings:* **1. Upper air data 2. Izaña, Canary Islands 3. Santa Cruz de Tenerife, Canary Islands 4. Spain.**

1935

3A–156 551.515.3(64)

Bidault, G., **Trombes marines observées en 1933.** [Waterspouts observed in 1933.] *Société des Sciences Naturelles du Maroc, Mémoires*, 41:98–102, Sept. **1935.** 5 figs. **NN**—Descriptive accounts of phenomena observed off Moroccan coast in 1933. *Subject Headings:* **1. Waterspouts 2. Moroccan Coast.**

3A–157 551.521

Debrach, J., **Mesures et enregistrements de la radiation solaire à Casablanca.** [Measurements and records of solar radiation at Casablanca.] *Société des Sciences Naturelles du Maroc, Mémoires*, 41:63–66, Sept. **1935.** 2 figs., table. **NN**—Organization and methods of solar radiation observations at Casablanca in 1933 are discussed, and the first results of direct solar radiation measurements are summarized. *Subject Headings:* **1. Solar radiation 2. Casablanca, Morocco.**

3A–158 551.521.3:551.593.54

Debrach, J., **Note préliminaire sur les variations de la transparence de l'atmosphère pour le rayonnement solaire à Casablanca.** [Preliminary note on variations of atmospheric transparency affecting solar radiation at Casablanca.] *Association Française pour l'Avancement des Sciences, Compte Rendu*, 59:254–257, **1935.** tables, 5 refs. **NN**—Author stresses the importance of the turbidity factor, as well as the astronomical, in determining solar radiation. Formulas considered. *Subject Headings:* **1. Atmospheric transparency 2. Solar radiation 3. Casablanca, Morocco.**

3A–159 551.524.37 551.509.532

§Debrach, J. and Bidault, G., **Types de temps d'hiver favorables aux gelées.** [Winter weather types favorable for frosts.] *Société des Sciences Naturelles du Maroc, Mémoires*, 41:66–83, Sept. **1935.** 13 figs., table, refs. **NN**—Synoptic analyses made of winter conditions which cause snow and frost in Morocco. *Subject Headings:* **1. Synoptic analysis 2. Frost 3. Snow 4. Morocco.**

3A–160 551.582(65)

Dubief, Jean and Queney, Paul, **Les grands traits du climat du Sahara algérien.** [The principle climatic factors of the Algerian Sahara.] *La Météorologie*, **1935.** p. 80–91. 8 figs., ref. **NN**—Authors give an early review of observations obtained from the newly developed meteorological station of the Sahara at Tamanrasset. Noted especially are the roles played by the "Sahara-Sudanese disturbances" and by the Sudanese monsoon in the weather of the Central Sahara. Data represented graphically rather than in tables. *Subject Headings:* **1. Climatology 2. Sahara Desert 3. Algeria.**

3A–161 551.586:612

Dubief, Jean and Peruès, Maurice, **Observations de météorologie medicale recueillies à Tamanrasset (Sahara Central).** [Observations of medical meteorology recorded at Tamanrasset.] *La Météorologie*, **1935.** p. 193–219. fig., 2 tables, refs. **NN**—Fairly detailed work studies the relations between the variations of the climatic elements in the central Sahara, using observations from the meteorological station at Tamanrasset in Hoggar, and their effects upon the physiology of organisms. *Subject Headings:* **1. Medical meteorology 2. Tamanrasset, Algeria 3. Sahara Desert.**

3A–162 551.577.2:551.577.31(612)

†Fàntoli, Amilcare, **La siccità in Libia.** [Drought in Libya.] (*R.*) *Accademia Nazionale dei Lincei, Rome, Commissione Italiana per lo Studio delle Grandi Calamita, Pubblicazioni*, 4°2 . 1935.

89 p. 13 figs., tables, fold, rainfall chart, 102 refs. **GB-MO**—The first part of this climatic monograph deals with the distribution and characteristics of rainfall and its relation to the synoptic situation, a long analysis of rainfall data, variations of rainfall and their relations to agricultural produce. Part 2 deals with the relation of population to physical geography, including lists of historical droughts and famines, and the necessity of limiting population. *Subject Headings:* **1. Precipitation 2. Drought 3. Libya.**

3A–163 551.582(66)

Perret, Robert, **Le climat du Sahara.** [Climate of the Sahara.] *Annales de Géographie*, 44:162–186, **1935.** 6 figs., refs. **NNA**—Climatic elements of the region as determined in numerous earlier works, are reviewed in the light of more extensive recent observations including some of the upper air. Pressure and winds, temperature, humidity, precipitation, types of weather and storm conditions, and climatic regions are taken up in some detail, including illustrative charts but no data. *Subject Headings:* **1. Climatology 2. Sahara Desert.**

3A–164 551.515.4(61)

Piersig, Walter, **Die Gewitterhäufigkeit im Meeresgebiet vor der nordwestafrikanischen Küste: ihr jahreszeitlicher Gang und ihre Verteilung zur Lage der Tropikfront.** [Thunderstorm frequency in the sea region off northwest Africa: annual occurrences and distribution in relation to the tropical front.] *Annalen der Hydrographie und Maritimen Meteorologie*, 63:461–466, **1935.** 2 figs., 3 tables, 5 refs. **DLC**—On the grounds of five years extensive observations author attempts to determine the distribution of thunderstorms in the sea region off the West African coast between 25° and 50°N. Thunderstorms seem to occur in connection with the intertropical front. Slight vertical extent of this air mass in trade winds makes it of little importance in formation of thunderstorms. *Subject Headings:* **1. Thunderstorm distribution 2. Northwest African Coast.**

3A–165 551.577.3

Rigotard, Marcel, **Intensité pluviométrique en Algérie.** [Rainfall intensity in Algeria.] *Revue Générale des Sciences Pures et Appliquées*, Paris, 46:453–455, Aug. **1935.** fig., table. **DLC, NNA**—Brief summary report gives percentages of different rainfall intensities for various regions of Algeria. Very little data. *Subject Headings:* **1. Rainfall intensity 2. Algeria.**

3A–166 551.586:63

*Schindler, P., **Application des statistiques climatologiques à l'étude des rapports du temps et des récoltes.** [Application of climatological statistics to the study of weather in relation to harvest.] *Société des Sciences Naturelles du Maroc, Mémoires*, No. 41:103–125, Sept. **1935.** tables. **NN** – Relations between climate and agriculture are studied in detail using statistics for Abda, 1933. *Subject Headings:* **1. Agricultural climatology 2. Morocco.**

3A–167 551.506(64)

Tableaux et résumés annuels. [Tables and annual summaries.] *Société des Sciences Naturelles du Maroc, Mémoires*, 41:8–62. Sept. **1935.** figs., extensive tables. **NN**—Observations kept in Morocco in 1932 and 1933 are tabulated and shown graphically. Included are: list of stations; precipitation tables and isohyets; temperature tables and charts; graphs of snowfall amounts; table of frequencies of "houle" (swells); a summary of synoptic weather conditions by periods during the year 1933; and earthquake records. *Subject Headings:* **1. Climatology 2. Climatic data 3. Morocco.**

1936

3A–168 551.557.2(64)

Dobbé, Maurice, **Le vent en altitude à Rabat.** [Upper air wind at Rabat.] *Association Française pour l'Avancement des Sciences, Compte Rendu*, 60:245–247. **1936.** fig. **NN**—Approximately 6,800 soundings, 1917–1930, are summarized briefly noting the predominant winds at various levels up to 5000 m. Diagram shows the predominant winds 200–3000 m. in accordance with the different weather types. *Subject Headings:* **1. Upper air winds 2. Rabat, Morocco.**

3A–169 551.506.7(65)

Dubief, Jean and Queney, Paul, **Résultats des sondages à deux théodolites exécutés au Hoggar, à l'Observatoire de Tamanrasset.** [Results of soundings with two theodolites made at Tamanrasset Observatory, Hoggar.] *La Météorologie*, **1936.** p. 194–159. 3 figs., 3 tables. **NN**—Results of 90 pilot balloon soundings with two theodolites, with a base line of 2313 m., in 1933 and 1934, are summarized in graphs and tables and results are analyzed. The soundings bear out evidence of physical discontinuities in the air, well-defined strata. *Subject Headings:* **1. Upper air observation 2. Hoggar, Algeria 3. Sahara Desert.**

3A–170 551.557 551.582(61)

Eredia, Filippo, **Il clima e, in particolare, le correnti aeree della Libia.** [The climate and, in particular, the air currents of Libya.] *Società Italiana per il Progresso delle Scienze, 25 Riunione, Atti*, Rome, 4(1):54–65, **1936.** table. **DLC, NN**—Descriptive account of climate in general as observed in Tripolitania and Cyrenaica; particular attention given to pressure distribution during the period of the Sahara depression. Table gives summary of seasonal wind velocities. Note on sandstorms included. *Subject Headings:* **1. Climatology 2. Atmospheric pressure 3. Upper air winds 4. Libya.**

3A–171 551.506:551.552 551.557(612)

*Eredia, Filippo, **Le correnti aeree al suolo e a quote a Bengasi.** [Air currents at the ground and aloft in Bengasi.] *Meteorologia Pratica*, 17(1):4–15, Jan. Feb. **1936.** figs., tables, refs. **NNA**—Frequency and velocity of winds at the surface and at altitudes of 500, 1000 and 2000 m. are estimated from results of soundings made over Bengasi from 1931 to 1934. Wind roses for each height and different hours are constructed for every season. *Subject Headings:* **1. Wind data 2. Upper air winds 3. Bengasi, Libya.**

3A–172 551.552 551.557(612)

*Eredia, Filippo, **Le correnti aeree al suolo e a quote a Tripoli.** [Air currents at the ground and aloft in Tripoli.] *Meteorologia Pratica*, 17(6):255–265, Nov.–Dec. **1936.** fig., tables, 2 refs. **NNA**—Observations made at the surface and at successive altitudes, 500, 1000, 1500, and 2000 meters above Tripoli five times daily during 1935 are reported and analyzed. Directions, velocities and frequencies are estimated, and wind roses drawn for different heights at various hours for each season. *Subject Headings:* **1. Wind data 2. Upper air winds 3. Tripoli, Libya.**

3A–173 551.506(64,65,611)

*France. Office National Météorologique, **Bulletin Quotidien de l'Afrique du Nord. 1. Maroc-Algérie-Tunisie.** July 1, **1929**–Oct. 31, **1936.** tables. **DWB**—Official daily observations, including aerological soundings as well as the usual elements, are tabulated for several stations of each country. *Subject Headings:* **1. Observational data 2. Upper air data 3. Morocco 4. Algeria 5. Tunisia.**

3A–174 551.582 551.586(65)

Jaeger, Fritz, **Trockengrenzen in Algerien.** [The humid-arid boundary in Algeria.] *Petermanns Geographische Mitteilungen, Ergänzungsheft* 223, **1936.** 67 p. 8 figs., map, tables. **NNA**—Reviewed by E. F. Gautier in *Geographical Review*, 27:169–170, 1937. Author tries to apply A. Penck's mathematical definition of the humid-arid boundary to Algeria, using his own personal observations and those of meteorological stations in region. He briefly discusses the plant life as an indication of the climate. Detailed map shows his estimate of the humid-arid boundary. French version in "Mélanges de Géographie et d'Orientalisme offerts à E. F. Gautier." *Subject Headings:* **1. Aridity 2. Climatology 3. Algeria.**

3A–175 551.573

*Lacrous, —, **L'évaporation en Tunisie.** [Evaporation in Tunisia.] *International Union of Geodesy and Geophysics, International Association of Scientific Hydrology, Bulletin*, No. 22:93–98, **1936.** tables. **NNE**—Observations made with a Piche evaporimeter at Tunis, 1901–1935, and for Tunis Lake, 1924–1932, are summarized in brief tables, and some comparisons with the diurnal temperature conditions in each season are made. *Subject Headings:* **1. Evaporation 2. Tunisia.**

3A–176 551.557

†Müller, Fritz, **Die Strömungen der Atmosphäre über Teneriffa.** [Atmospheric currents over Tenerife.] *Leipzig, Universität, Geophysikalisches Institut, Veroffentlichungen, 2nd Ser.*, 8(3):133–180, **1936.** 16 figs., 6 tables, 30 refs. **NNA**—Upper air observations are analyzed in a study of atmospheric circulation in the northeast Atlantic trades region. Author finds that his observations bear out earlier pilot balloon records kept by R. Wenger (1909–1912). Characteristics of the upper currents over Tenerife are noted, wind direction, speed and steadiness and vertical gradient of wind speed. In the second part of the treatise theoretical analysis is made of the observations kept. Periodicity or some sort of system is sought in wind variations. Results are well illustrated in schematic diagrams and summary tables. *Subject Headings:* **1. Atmospheric circulation 2. Upper air winds 3. Tenerife, Canary Islands.**

3A–177 551.542:551.555.1

†§Piersig, Walter, **Schwankungen von Luftdruck und Luftbewegungen sowie ein Beitrag zum Wettergeschehen im Passatgebiet des östlichen Nordatlantischen Ozeans.** [Variations in air

pressure and air movements as they contribute to weather changes in the region of the trades in the North Atlantic Ocean.] *Aus dem Archiv der Deutschen Seewarte*, Hamburg, 54(6), **1936.** 41 p. 20 figs., 10 tables, 59 refs. **NN**—Thorough analysis made of the trade winds of the eastern Atlantic off the northwest coast of Africa. The wind currents, atmospheric pressure, and particular weather phenomena of the region are reviewed, including their variations and causes—seasonal, annual, zonal, etc. Several synoptic situations are analyzed. A good list of references of synoptic aerological studies is appended. *Subject Headings:* **1. Synoptic studies 2. Pressure variations 3. Atmospheric circulation 4. Trade winds 5. Northeast Atlantic Ocean. 6. Northwest African Coast.**

3A–178 551.543:551.515.4(61)

§Regula, H., **Pressure changes and "tornadoes" (squalls) on the west coast of Africa.** *American Meteorological Society, Bulletin*, 24:311–317, Oct. **1943.** Trans. by EDNA S. STONE from *Annalen der Hydrographie und Maritimen Meteorologie*, 64:107–111, 1936. 8 figs. **NN**—Problems of forecasting weather, and especially the squalls, of northwest Africa are considered, and analysis made of relations between pressure changes, wind variations and the squalls. Illustrative synoptic situations are included. *Subject Headings:* **1. Pressure changes 2. Squalls 3. Northwest African Coast. I. Stone, Edna S.** (*trans.*).

3A–179 551.591.32(8)

Sanson, J., **Variations mensuelles de la visibilité en Afrique du Nord.** [Monthly variation of visibility in North Africa.] *Association Française pour l'Avancement des Sciences, Compte Rendu*, 60:239–240, **1936.** table. **NN**—Annual frequencies of different degrees of visibility for 1000 observations at each of 12 Northwest African stations are briefly noted. *Subject Headings:* **1. Visibility 2. North Africa.**

3A–180 551.543.1

Seltzer, P., **Sur la variation diurne de la pression atmosphérique à Alger.** [On diurnal variation of atmospheric pressure at Algiers.] *La Météorologie*, **1936.** p. 484–487. 2 figs. **NN**—Monthly curves of mean pressure variation are drawn as a result of barogram records, 1919–1934, at Algiers. *Subject Headings:* **1. Diurnal pressure variations 2. Algiers, Algeria.**

3A–181 551.506.1(612,635)

*Italy. Ministero delle Colonie, **Bollettino Meteorologico delle Colonie Italiane.** Ser. 2, Nos. 1, 2. 1932–1933. Tripoli, **1934, 1936.** 367 p. 396 p. extensive tables. **NNA, DWB, NN**—Daily observations of climatological elements made at numerous meteorological stations in Tripolitania, Cyrenaica, Eritrea, and Italian Somaliland are tabulated at length for each year. (*See also items* 3A–123, -127.) *Subject Headings:* **1. Observational data 2. Tripolitania 3. Cyrenaica 4. Italian East Africa.**

1937

3A–182 551.577.2(6)

*Algeria. Service Météorologique. **Hauteurs de pluie.** [Rainfall amounts.] Ser. 1, Nos. 1–6, Sept. 1, **1914** April 30, **1916**; Ser. 2, nos. 1–61, Sept. 1, **1922**–Dec. 31, **1937.** charts, tables. **DWB**—Four-month precipitation totals and normals for various stations in Algeria, Morocco and Tunisia are tabulated, and isohyets are added to a rainfall chart of North Africa for each four-month period in the series. *Subject Headings:* **1. Precipitation 2. Algeria 3. Morocco 4. Tunisia.**

3A–183 551.555.8

†§Combier, C.; Gaubert, P.; Petitjean, Lucien et al, **Vents de sable et pluies de boue.** [Sand storms and mud rains.] *France, Office National Météorologique, Mémorial*, No. 27, **1937.** 135 p. map, 31 figs., tables, refs. **NN**—A collection of notes and papers on sand storms and mud rains. First part includes discussion of their general characteristics, meteorological conditions and occurrences in the Sahara and in Syria, and origin of sediment. Second part includes descriptions of particular occurrences in 1930, some in Algeria; third part includes 12 accounts of mud rains and sand storms in other years, many in North Africa. *Subject Headings:* **1. Sandstorms 2. Mud rains 3. Algeria 4. Tunisia 5. Sahara Desert 6. Syria.**

3A–184 551.582(612):551.586:61

Eredia, Filippo, **Il clima della Tripolitania.** [Climate of Tripolitania.] [Tripoli, **1937.**] 31 p. 3 figs., tables. **DWB**—General summary of Tripolitanian climate is made, citing briefly some summary data, noting regional and seasonal variations, peculiarities, etc. and the effects of climate on tuberculosis occurrence and cure. *Subject Headings:* **1. Climatology 2. Medical climatology 3. Tuberculosis 4. Tripolitania.**

3A–185 551.552 551.513

Eredia, Filippo, **Le osservazioni anemologiche eseguite nella Libia e nell'Impero Italiano in relazione alla circolazione atmosferica generale del continent africano.** [Anemological observations made in Libya and in the Italian Empire in relation to the general atmospheric circulation of the African continent.] *Meteorologia Pratica*, 18(3):93–106, **1937.** 4 figs., 5 tables, 9 refs. **NNA**—Frequencies and directions of winds over Libya and Italian East Africa are studied with regard to the general pressure and circulation system of Africa. *Subject Headings:* **1. Winds 2. Atmospheric circulation 3. Libya 4. Italian East Africa 5. Africa.**

3A–186 551.593.54:551.521.1

†*Failletaz, R., **La radiation solaire et le trouble atmosphérique à Tamanrasset (Hoggar).** [Solar radiation and atmospheric turbidity at Tamanrasset, (Hoggar).] *France, Office Nationale Météorologique, Memorial*, No. 26, **1937.** 75 p. 29 figs., tables, 40 refs. **DWB, NN**—An extensive detailed survey is made of pyrheliometric observations kept in Hoggar during the year 1933. Calculation of turbidity factor and conditions from study of radiation values is discussed theoretically at length. Tables of radiation intensities, results of radio soundings, etc. included. *Subject Headings:* **1. Solar radiation 2. Turbidity 3. Hoggar, Algeria 4. Sahara Desert.**

3A–187 551.582:016(64)

†Roux, Georges, **Bibliographie.** [Of all meteorological and geophysical publications relating to Morocco or written by authors living in Morocco.] *Société des Sciences Naturelles du Maroc, Mémoires*, No. 44:82–94, Dec. **1937. NN**—An excellent, chronological, annotated bibliography listing mostly items on climatology, but including some papers on seismology, terrestrial magnetism, etc. First, a list is given of serials and their numbers in which systematic meteorological observations of Morocco appear. Then follows the chronological list. This is a thorough and important bibliography, most items of which have not been included in the present bibliography. *Subject Headings:* **1. Climatology 2. Geophysics 3. Bibliographies 4. Morocco.**

3A–188 551.506:551.524.36(64)

*Roux, Georges, **Contribution à l'étude du climat du Maroc; les températures maxima et minima.** [Contribution to the study of climate of Morocco; maximum and minimum temperatures.] *Société des Sciences Naturelles, du Maroc, Mémoires*, No. 44:17–57, Dec. **1937.** extensive tables. **NN**—Temperature data are tabulated for 29 stations in Morocco, which were selected for quality and duration of their observations with a minimum of 8 years. Work consists almost entirely of data, averaged, systematized and arranged comparatively. Introductory text stresses some of the inconsistencies, variations, inhomogeneities, etc. of the available data. *Subject Headings:* **1. Temperature data 2. Morocco.**

3A–189 551.582:63(64)

Schindler, P., **Influence de la nature des terres sur les rapports du temps avec les récoltes.** [Influence of the nature of the soil on relations between weather and harvest.] *Société des Science Naturelles du Maroc, Mémoires*, No. 44:63–81, Dec. **1937.** 4 figs., 3 tables, 16 refs. **NN**—Combined effects of soil and climate on agriculture are discussed. Some rainfall and temperature statistics for Behatra, Ameur, Rebia and Temra are illustrated in graphs and summarized in tables. References are all on agricultural climatology in general rather than on Morocco. *Subject Headings:* **1. Agricultural climatology 2. Morocco.**

3A–190 551.582(64)

†*§Société des Sciences Naturelles du Maroc, **Mémoires.** July **1934**; Sept. **1935**; Dec. **1937.** charts, tables, refs. **NN, DWB**—Three issues of the periodical bear the title: "Mémoire Annuel Consacré à la Physique du Globe et à la Météorologie au Maroc." In addition to tables, graphs, charts, etc. of meteorological observations, each issue contains articles on geophysics and meteorology, listed as follows by issue, author and title. (More important articles are also listed and annotated separately in the present bibliography; their respective item numbers are given.)

Mémoire, No. 39, July 31, 1934.

Debrach, J., **Sur une determination du degré géothermique au Maroc.** [On a determination of the earth temperature in Morocco.]

Roux, G., **La neige au Maroc.** [Snow in Morocco.]

Roux, G., **La neige pendant l'hiver 1931–1932.** [Snow in winter 1931–1932.]

Mémoire, No. 41, Sept. 15, 1935.

Debrach, J., **Mesure et enregistrements de la radiation solaire à Casablanca.** *See item* 3A–157.

§Debrach, J. and Bidault, G., **Types de temps d'hiver favorables au gelées.** *See item* 3A–159.

Roux, G., **Les vents au Maroc. Noms de vents.** [Winds of Morocco. Names of the winds.]

Renaud, H.-P.-J., **Note sur les noms des vents chez les indigènes du Maroc occidental.** [Note on the names of winds of western Morocco according to the aborigenese.]

Marcy, G., **Notes linguistes relatives à la terminologie marocaine des vents.** [Linguistic notes on Moroccan terminology for winds.]

Bidault, G., **Trombes marines observées en 1933.** *See item* 3A–156.

*Schindler, P., **Application des statistiques climatologiques à l'étude des rapports du temps et des récoltes.** *See item* 3A–166.

Mémoire, No. 44, Dec. 15, 1937.

Debrach, J., **Transparence atmosphérique; notion de "trouble". . . .** [Transparency of the atmosphere; idea of turbidity.]

*Roux, G., **Contribution à l'étude du climat du Maroc; les températures maxima et minima.** *See item* 3A–188.

Ferraton, J.-L., **Note sur les marées de tempête observées sur le littoral atlantique du Maroc.** [Note on storm tides observed on the Atlantic coast of Morocco.]

Roux, G., **Une station météorologique de montagne au Maroc: la station d'Ifrane.** [Mountain meteorological station of Morocco. Ifrane station.] Brief account of founding and operations of station, with photos.

Schindler, P., **Influence de la nature des terres sur les rapports du temps avec les récoltes.** *See item* 3A–190.

†Roux, G., **Bibliographie.** *See item* 3A–187.

Subject Headings: **1. Temperature 2. Precipitation 3. Snow 4. Frost 5. Solar radiation 6. Winds 7. Waterspouts 8. Agricultural climatology 9. Turbidity 10. Storm tides 11. Meteorological stations 12. Bibliographies 13. Morocco: I. Debrach, Jean. II. Roux, Georges III. Bidault, G. IV. Renaud, H.-P.-J. V. Marcy, G. VI. Schindler, P. VII. Ferraton, J.-L.**

3A–191 551.583.

Stebbing, E. P., **The threat of the Sahara.** *Royal African Society, Journal*, 36, *Extra Supplement*, May 25, 1937. 35 p. **NNA**—Spreading of the desert conditions of the Sahara is blamed on misuse of the land rather than on climatic causes. Conditions in geologic and historic times are reviewed up to the modern and causes of desiccation are related. No data are included. *Subject Headings:* **1. Climatic changes 2. Desiccation 3. Sahara Desert.**

1938

3A–192 551.506.1(65

*§Algiers. Université. Institut de Météorologie et de Physique du Globe. **Bulletin Météorologique de L'Algérie.** 69 Vols. April 1877–Dec. 1938. Title varies. *Also:* **Bulletin Météorologique Synoptique**, March 1946+. charts, tables. **DWB**—Official publication giving daily observational data and synoptic charts. *Subject Headings:* **1. Observational data 2. Synoptic charts 3. Algeria.**

3A–193 551.521.

Bois, Charles, **Resultats de dix années de mesures d'insolation en Tunisie.** [Results of 10 years of insolation measurements in Tunisia.] *Annales de Physique du Globe de la France d'Outre-Mer*, 5-97-99, Aug. 1938. 3 tables. **NNA**—Observations made 1928-1937 are briefly reviewed, analyzed and summarized in small tables. *Subject Headings:* **1. Insolation 2. Tunisia.**

3A–194 551.577.3

Bois, Charles, **Sur les pluies torrentielles en Tunisie.** [Torrential rains in Tunisia.] *Academie des Sciences, Paris, Comptes Rendus*, 207:1064-1066, 1938. table, 2 refs., equation. **NN**—Note briefly summarizes research on frequency and importance of heavy rains in Tunisia, based on a study of observations 1918-1937 of 80 stations. *Subject Headings:* **1. Rainfall extremes 2. Tunisia.**

3A–195 551.501.9(6

Bruyère, P., **Rapport historique de la Mission Météorologique Française sur les travaux effectués à Tamanrasset pendant l'année polaire 1932–33.** [Report of the French Meteorological Mission on work done at Tamanrasset in the polar year 1932–33.] *Année Polaire Internationale 1932-1933*. Paris. 2:235–255. 1938. 19 figs. **NNA**—The history, founding, instrument, observational procedures and lists of results of the observatory at Tamanrasset in the Algerian Sahara are described. No data included. *Subject Headings:* **1. Meteorological observatories 2. Tamanrasset, Algeria, Observatoire Jules Carde 3. Sahara Desert 4. Algeria.**

3A–196 551.582(469.8)

† Carvalho de Lacerda Castelo Branco, Hugo. **The climate of Madeira, with a comparative study.** Madeira, 1938. 118 p. map, photos, figs., tables, refs. Trans. from French by ALBERTO FIGUEIRA JARDIM. **DLC, NNA**—Author presents an extensive, somewhat popular style, survey of Madeira's climate. The science of climatology in general is defined at length. There follows a summary of earlier meteorological studies of Madeira, from 1811 to 1934; items are arranged chronologically and well summarized. Brief statistical comparisons of climatic elements of Funchal are made with those of other cities of Europe and Africa. A climatological picture is given by fairly detailed tables and diagrams of annual and monthly values of usual elements, for 1923–1934, from observations made at Funchal climatological station. Further climatic comparison made with climate of Côte d'Azur, Lisbon, etc. Living conditions in respect to climate are given and, finally, additional geo-topographical and statistical information on population and health. *Subject Headings:* **1. Climatology 2. Madeira. I. Jardim, Alberto Figueira** (*trans.*).

3A–197 551.521(64)

Debrach, J., **Sur les valeurs les plus elevées de la radiation solaire observée au Maroc.** [The highest values of solar radiation observed in Morocco.] *Société des Sciences Naturelles du Maroc. Comptes Rendus des Séances Mensuelles*, Dec. **1938.** p. 61–64. 4 tables, 6 refs. Reprint. **DWB**—Very brief summary of solar radiation intensities at about five points in Morocco, using one-year observations kept between 1933–1938. *Also:* by DEBRACH, a note in French in *Annales de Physique du Globe de la France d'Outre-mer*, 5(25):1–3, 1938, on actinometric observations and studies in Morocco in which procedures, scope, etc. are reviewed. No data. *Subject Headings:* **1. Solar radiation 2. Morocco.**

3A–198 551.510.42

Eredia, Filippo, **La sabbia dell'amosfera.** [Sand in the atmosphere.] *Rivista di Meteorologia Aeronautica*, 2(1)983–99, March **1938.** 2 figs., tables, refs. **NN**—Discussion of three types of sand and dust in the atmosphere: 1) *nebbia di sabbia*, 2) *turbini* . . . and 3) *venti* . . . (dust clouds, dust devils, sand storms). Their characteristics, causes and places of occurrence are taken up. The desert regions of Africa, Sahara, Libya, Sudan, etc. are mentioned as well as Syria and other parts of the Near East. *Subject Headings:* **1. Atmospheric pollution 2. Dust 3. Sandstorms 4. Sahara Desert 5. Africa 6. Near East.**

3A–199 551.582(61)

†Fàntoli, Amilcare, **I risultati delle ricerche meteorologiche in Libia.** [Results of meteorological research in Libya.] *Rivista delle Colonie*, Rome, 12(11):1469–1483, Nov. **1938.** 4 charts, 2 photos, 9 refs. **NNA**—Climatic elements described and discussed; climatic zones noted and shown on maps, as well as rainfall distribution. Photographs of Bengasi observatory and el-Feuhiat ecological stations are included. *Subject Headings:* **1. Climatology 2. Climatic regions 3. Libya.**

3A–200 551.577.2(64)

Frolow, Vladimir, **La composante annuelle des pluies au Maroc.** [The annual componant of rainfall at Morocco.] *Académie des Sciences, Paris, Comptes Rendus*, 206(16):1226–1228, April **1938.** fig., 2 refs. **NN**—Study of rainfall statistics of Morocco results in a chart showing annual precipitation distribution and the conclusion that this is determined by the topography of the country. *Subject Headings:* **1. Precipitation distribution 2. Morocco.**

3A–201 551.589.1:551.513(8)

Petitjean, Lucien, **Climatologie dynamique de l'Afrique du Nord.** [Dynamic climatology of North Africa.] *Annales de Physique du Globe de la France d'Outre-Mer*, 5:10, 18–19, 23, **1938.** graph, refs. **NNA**—Suggested that climatic conditions of North Africa be studied by analyses of air mass movements and atmospheric circulation rather than by statistics. Graph shows barometric pressure curves in various parts of North Africa, Morocco to Tripoli, for the years 1884–1908. Effects of Mediterranean influence on pressure at Algiers are studied synoptically. *Subject Headings:* **1. Dynamic climatology 2. Atmospheric circulation 3. North Africa.**

3A–202 551.526.6

Roux, Georges, **Isothermes mensuelles provisoires de l'eau de mer à la surface au large des côtes du Maroc.** [Monthly provisional isotherms of the surface water of the Ocean off the coasts of Morocco.] *Annales de Physique du Globe de la France d'Outre-Mer*, 5(25):24, **1938.** 12 charts, ref. **NNA**—Isotherms of surface temperatures in the ocean off Morocco are charted from 5 years' observations by merchant ships. However, the actual effects of these ocean temperatures on Moroccan climate are not taken up. *Subject Headings:* **1. Sea temperatures 2. Atlantic Ocean 3. Morocco.**

3A–203 551.506:551.577(611

*Tunis. Direction Générale de l'Agriculture, du Commerce et de la Colonisation, **Tableaus des Pluies.** [Rainfall tables.] Extract from: *Tunis, Direction Générale de l'Agriculture, du Commerce et de la Colonisation, Bulletin*, **1931–1938.** maps, tables. **DWB**—Rainfall statistics for three-month (seasonal) periods (Sept. 1930–Feb. 1938) for numerous stations in Tunisia are tabulated and rainfall maps are drawn for each period. *Subject Headings:* **1. Precipitation data 2. Tunisia.**

1939

3A–204 551.506.3:551.577(611

*Bois, Charles, **Intensité et durée des chutes de pluie à Tunis.** [Intensity and duration of rainfalls at Tunis.] *Annales de Physique du Globe de la France d'Oûtre-Mer*, 6:121–126, Aug. **1939** 5 tables, 4 ref. **NNA**—Quantity and duration of rainfall at Tunis are studied using observations for 1909–1938. Results summarized in brief tables. *Subject Headings:* **1. Precipitation 2. Long period records 3. Tunis, Tunisia.**

3A–205 551.506:551.37(611

*Bois, Charles, **Les pluies torrentielles en Tunisie.** [Torrential rainfall in Tunisia.] *Annales de Physique du Globe de la France d'Oûtre-Mer*, 6:3–7, Feb. **1939.** 4 figs., 4 tables, refs. **NNA**—Heavy rainfalls recorded 1926–1936 at various places in Tunisia are discussed. Charts show isolines for two individual occurrences. Tables give annual frequencies of torrential rains at numerous stations of Tunisia, maxima in 24 hours, etc. *Subject Headings:* **1. Rainfall extremes 2. Precipitation data 3. Tunisia.**

3A–206 551.582(64

†Debrach, J. and Bidault, G., **État de nos connaissances sur le climat de la montagne marocaine** [State of our knowledge on Moroccan mountain climate.] *Maroc Médical*, Casablanca, 19(209):394–402, **1939.** 7 figs., tables, 25 refs. **DSG**—Authors summarize knowledge of Moroccan mountain climate at that time, using the fragmentary data kept at various mountain stations at the Moroccan network. The various climatic elements are considered separately accompanied by brief tables and schematic diagrams: solar radiation, nebulosity, temperature, humidity, precipitation, climatic regions, and influence of mountains on climate. A good list of references to works on Moroccan climate in general is appended, as well as a summary table of various climatic normals for 16 mountain stations of Morocco, including altitudes, climatic type, rainfall coefficient, index of aridity, etc. Practically the identical article appears in *Hesperis*, 25:199–209, 1938. **NNA.** *Subject Headings:* **1. Climatology 2. Mountain meteorology 3. Morocco.**

3A–207 551.593.54:551.521.32(64

Debrach, Jean, **Sur une relation entre le trouble atmosphérique et le rayonnement nocturne** [On relation between atmospheric turbidity and nocturnal radiation.] *Académie des Sciences, Paris, Comptes Rendus*, 208:1739–1741, May, **1939.** fig., table, 4 refs. **NN**—Effect of turbidity on nocturnal radiation in Morocco is noted briefly. *Subject Headings:* **1. Nocturnal cooling 2. Turbidity 3. Morocco.**

3A–208 551.513:551.577 551.576.

Dubief, Jean, **La circulation atmosphérique et les pluies sur le Sahara en 1939.** [Atmospheric circulation and rainfall in the Sahara in 1939.] *Algiers, Institut de Météorologique et de Physique du Globe, Annuaire, Sahara*, p. B0–B13, **1939.** 13 charts, table. **NNA**—Monthly isohyets given accompanied by brief synoptic analysis of month's general meteorological conditions. Also: "Note sur la nebulosité au Hoggar." [Note on cloudiness in Hoggar.] *Ibid.*, p. C1–C4. 3 figs., 2 tables, 4 refs. Annual and diurnal variations are discussed from study of observations 1932–1939. *Subject Headings:* **1. Atmospheric circulation 2. Precipitation 3. Cloudiness 4. Sahara Desert 5. Hoggar, Algeria.**

3A–209 551.577.

*Fàntoli, Amilcare, **Elementi preliminari della pluviometria libica.** [Primary elements of the rainfall of Libya.] *Agricoltura Coloniale*, Florence, 33(1):1–27, Jan. **1939.** 4 maps, numerous tables, refs. **NNA**—Five climatic regions of Tripolitania and Cyrenaica are defined and illustrated on maps, as are areas of rainfall amounts. Numerous tables give rainfall amounts and frequencies for varying periods of time at numerous stations in each climatic-geographical region of Libya. *Subject Headings:* **1. Precipitation 2. Climatic regions 3. Libya.**

3A–210 551.582(61

*Fàntoli, Amilcare, **Zone climatiche delle Libia.** *and:* **Le pioggie in Libia.** [Climatic zones of Libya. and: Rainfall in Libya.] *Africa Italiana*, Rome, 2(11):15–28, **1939.** 2 maps, 5 tables,

NNA—Two consecutive articles give descriptive accounts with photographs and two rainfalls maps. Mean monthly values for temperature, relative humidity and rainfall for five stations representing different climatic zones in Libya for varying periods of time are summarized in short tables p. 30. *Subject Headings:* **1. Climatology 2. Precipitation 3. Libya.**

3A–211 551.515.8

§Landi, A., **Il fronte tropicale sul Mediterraneo.** [Tropical front over the Mediterranean.] *Rivista di Meteorologia Aeronautica*, 3:3 25, **1939.** 14 figs., 22 refs. **NN**—Synoptic-aerological survey made of air masses and fronts and resulting meteorological conditions over the western Mediterranean and Northwest Africa including illustrative synoptic charts and wind diagrams. *Subject Headings:* **1. Tropical fronts 2. Synoptic aerological studies 3. Mediterranean 4. Northwest Africa.**

3A–212 551.582(65)

Petitjean, Lucien, **Sur la climatologie dynamique de l'Algérie en 1918 et 1928.** [On the dynamic climatology of Algeria in 1918 and 1928.] *Algiers, Institut de Météorologie et de Physique du Globe, Annuaire, Algérie du Nord*, **1939.** p. A1–A7. 3 maps, 3 plates, 4 tables. **NNA**—Climatological conditions in northern Algeria in 1918–1928 are reviewed and summarized in graphs, diagrams and maps. One table gives period in which continental air masses have dominated over Algeria; others give wind conditions. *Subject Headings:* **1. Climatology 2. Dynamic climatology 3. Algeria.**

3A–213 551.555.8:551.524.37(65)

Petitjean, Lucien; Grandjean, A. and Dunoyer, Mme M., **Le sirocco et les gelées en Algérie 1938 et 1939.** [The sirocco and frosts in Algeria 1938 and 1939.] *Algiers, Institut de Météorologie et de Physique du Globe, Annuaire, Algérie du Nord*, **1939.** p. B1–B10. 8 charts, 6 tables. **NNA**—Observations of sirocco, frosts, and temperature maxima and minima are discussed, tabulated, and shown by isolines. *Subject Headings:* **1. Sirocco 2. Frost 3. Algeria.**

3A–214 551.506.1(64)

*Rabat, Morocco. Institut Scientifique Chérifien, Service de Physique du Globe et de Météorologie, **Résumé Climatologique. 1934–1939.** 3 Vols. Previous to Jan. 1938, title is **Relevé climatologique.** tables. **DWB**—Observational data of usual climatic elements for numerous stations of Morocco are tabulated monthly. *Subject Headings:* **1. Observational data 2. Morocco.**

3A–215 551.513

Reuter, F., **Die halbjährige Luftzirkulation im NO-Passatgebiet des Nordatlantischen Ozeans über Teneriffa.** [The semi-annual atmospheric circulation in the northeast trades region of the North Atlantic Ocean above Tenerife.] *Annalen der Hydrographie und Maritimen Meteorologie*, 67:67–70, **1939.** 4 figs., 4 refs. **NNA**—Highly theoretical work including discussion of theories of MÜLLER and VON FICKER. *Subject Headings:* **1. Atmospheric circulation 2. Trade winds 3. Canary Islands 4. Northeast Atlantic Ocean.**

3A–216 551.577.21(611)

*Tunis. Service Météorologique, **Relevé pluviométrique.** Sept. **1928**–July **1939.** tables. **DWB**—Precipitation statistics for each month of each year are tabulated for numerous stations (by region) of Tunisia. *Subject Headings:* **1. Precipitation 2. Observational data 3. Periodicals 4. Tunisia.**

3A–217 551.506.1(611)

*Tunis. Service Météorologique, **Résumé climatologique.** Sept. **1925**–July **1939.** (Sept. 1937 missing). **DWB**—Climatological data tabulated and charted along with brief notations for each month. *Subject Headings:* **1. Observational data 2. Tunis, Tunisia.**

1940

3A–218 551.582.2(612)

Arnberger, Erik, **Einige Temperatur- und Feuchtigkeitsmessungen in Tripolitanien.** [Some temperature and humidity measurements in Tripolitania.] *Geographische Gesellschaft in Wien, Mitteilungen*, 83:249–257, **1940.** 3 figs., refs. **NNA**—The steppe-type climate of the region near the coast of Tripolitania is discussed from observations at different points, made on a trip by the author. Particular attention is given to observations in the city of Tripoli. *Subject Headings:* **1. Temperature 2. Humidity 3. Tripolitania.**

3A–219 551.577(65)

Capot-Rey, Robert, **Une carte des pluies et des crues au Sahara.** [A map of rainfall and floods in the Sahara.] *Annales de Géographie*, Paris, 49:223–227, Oct.–Dec. **1940.** Also in: *Algiers, Institut de Météorologie et de Physique du Globe, Annuaire, Sahara*, **1939.** p. A1–A3. map, 9 refs. **NNA**—Observations from 31 regular stations are used to construct rainfall distribution map for Saharan parts of Algeria. Three types of rainfall and their causes are distinguished. *Subject Headings:* **1. Precipitation 2. Floods 3. Sahara Desert 4. Algeria.**

3A–220 551.577

§Dubief, Jean, **Les pluies au Sahara en 1940.** [Rainfall in the Sahara in 1940.] *Algiers, Institut de Météorologie et de Physique du Globe, Annuaire, Sahara*, **1940.** p. A1–A15. 16 charts. **NNA**—Author further discusses the effects of the "Sahara-Sudanese disturbances" and the Sudanese monsoon on climatological conditions, especially rainfall of the Central Sahara. Synoptic and rainfall charts included. *Subject Headings:* **1. Rainfall 2. Sahara Desert 3. Algeria.**

3A–221 551.577.2(64)

*Rabat, Morocco. Institut Scientifique Chérifien, Service de Physique du Globe et de Météorologie, **Statistique Pluviométrique, Année Agricole 1939–40.** [1940]. 1 p. folded. **DWB**—Single large table gives rainfall totals Sept. 1939–Aug. 1940 for numerous points in Morocco. *Subject Headings:* **1. Precipitation 2. Observational data 3. Morocco.**

1941

3A–222 551.583.7

Dresch, Jean, **Climat actuel et paleoclimats.** [Present climate and paleoclimates.] (In his: **Recherches sur l'évolution du relief dans le Massif Central du Grand Atlas, le Haouz et le Sous.** Tours, **1941.** p. 555–587. 6 figs., table, refs.) **NNA**—Author includes a chapter on climate in a large volume on geological history. The present climate is discussed in general, and then the particular elements by geographical region. Then paleoclimates are taken up: from the end of the Primary to the Pliocene and the late Pliocene and Quaternary. He considers methods of erosion in relation to the paleoclimates. Only a small amount of data are tabulated, but schematic charts illustrate some climatological values. *Subject Headings:* **1. Climatology 2. Paleoclimatology 3. Grand Atlas Mountains 4. Morocco.**

3A–223 551.582(661)

France. Office National Météorologique, **Aperçu climatologique sur le parcours projeté du Transsaharien.** [Climatic summary on the projected trans-Saharan expedition.] Aug. **1941.** 62 p. fig., tables. Mimeographed. **GB-MO**—The proposed route was from Colomb Béchar to Segou. Climatic data and tables are given for 16 stations along the route. Monthly tables include mean monthly maximum, minimum and mean temperatures, extremes, days of frost and temperature exceeding 40° and 50°C., relative humidity, rainfall, raindays, heavy rains, strong winds, dust or sand storms, fogs, thunderstorms. *Subject Headings:* **1. Climatology 2. Sahara Desert 3. Algeria 4. French West Africa.**—*C.E.P.B.*

3A–224 551.524(64)

Roux, Georges, **L'amplitude des variations de la température au Maroc.** [Degree of temperature variations in Morocco.] *Maroc Médical*, Casablanca, 21(218):152–153, **1941.** table, 4 refs. **DSG**—Diurnal and annual variations of temperature in Morocco are calculated with explanatory comment, using data from 29 selected stations. *Subject Headings:* **1. Temperature variations 2. Morocco.**

3A–225 551.506.1(611)

*Tunis, Service Météorologique, **Observations, Oct. 1939 June 1941.** tables. unpublished copies of originals. **DWB**—Monthly means are calculated for numerous stations of Tunisia: rainfall data for the entire period; temperature and wind data for Oct. and Nov. 1939. *Subject Headings:* **1. Observational data 2. Tunisia.**

1942

3A–226 551.521.12

Castet, J., **Sur l'intensité de la radiation solaire directe et ses causes d'affaiblissement à Tamanrasset.** [On the intensity of direct solar radiation and the causes of its weakening at Tamanrasset.] *Algiers, Institut de Météorologie et de Physique du Globe, Annuaire, Sahara*, **1942.** p. 37–39. fig., 2 tables, 6 refs. **NNA**—Conditions of dust in the atmosphere are related to diurnal and seasonal variations in radiation intensities at Tamanrasset. *Subject Headings:* **1. Solar radiation 2. Dust 3. Turbidity 4. Tamanrasset, Algeria.**

3A–227 551.555.8

Dubiet, Jean, **Sur les vents de sable du Sahara algérien.** [On the sand storms of the Algerian Sahara.] *Académie des Sciences, Paris, Comptes Rendus*, 215:374–376, **1942.** table. **NN**—Fifteen years' observations of sand storms, 1925–1939, for numerous Sahara stations are summarized in table and briefly discussed. *Subject Headings:* **1. Sandstorms 2. Sahara Desert 3. Algeria.**

3A–228 551.573(64)

*Roux, Georges, **Premières mesures d'évaporation au Maroc.** [Preliminary evaporation measurements in Morocco.] *Société des Sciences Naturelles du Maroc, Bulletin*, 22:141–148, **1942.** 3 tables, 5 refs. **NNM**—Results of observations with a Piche evaporimeter at various stations in Morocco are tabulated with brief discussion. One table lists locations of stations; the second gives means for numerous years for each station; the third gives homogenous means for the period 1936–1940. *Subject Headings:* **1. Evaporation 2. Morocco.**

3A–229 551.582.1(64)

Schröder, G., **Klimatographische Witterungsschilderung, Nr. 165. Marokko. . . .** [Climatographic weather sketch, No. 165, Morocco. . . .] *Annalen der Hydrographie und Maritimen Meteorologie*, 70:356–357, **1942. NNA**—Details are given of conditions on a rainy day at Casablanca, Oct. 4, 1935, which brought the first rain after the dry season that year. *Subject Headings:* **1. Climatology 2. Casablanca, Morocco.**

3A–230 551.582 551.586

*§U. S. Air Weather Service, **Climate and weather of the west coast of Africa and the eastern Atlantic Islands with appendix on bioclimatology of coastal regions of the southern North Atlantic and the South Atlantic.** *U. S. Air Weather Service, Publications*, 2(3), **1942.** p. 12 figs., diagrs., tables. **DLC**—Detailed discussion of the climate of the coastal area of Africa from the southern boundary of Sierra Leone north to Strait of Gibraltar is given dividing the region into the drier section above, and the wetter below 15°N. lat. All climatic elements as well as air mass analysis, climatic types, atmospheric circulation, upper air winds, thunderstorms and "tornadoes," cloudiness, ceilings, visibility, fogs, haze and dust, along with rather brief but representative data, are considered for the coastal area of the continent and the islands of the eastern Atlantic. *Subject Headings:* **1. Climatology 2. Aeronautical climatology 3. Bioclimatology 4. West Africa 5. Sierra Leone 6. Gibraltar 7. Canary Islands 8. Cape Verde Islands 9. Madeira.**

3A–231 551.591.2(65,611)

*U. S. Weather Bureau, **Visibility data for selected stations in Algeria and Tunisia.** *U. S. Weather Bureau, Special Report* No. 153, **1942.** 7 p. tables. **DWB**—Monthly and seasonal normals for varying numbers of observations are tabulated for five stations in Algeria and two in Tunisia. *Subject Headings:* **1. Visibility 2. Algeria 3. Tunisia.**

1943

3A–232 551.515

§Boyden, M. W. and Fowler, Earle C., **The weather disturbances of French North Africa.** (In: **A report of synoptic conditions in the Mediterranean area.** Chicago, University, Department of Meteorology, **1943.** p. 114–127. 3 charts, 7 refs.) **DWB**—Using material from various French meteorological papers (listed), authors have tried to give a comprehensive picture of the principal weather types in North Africa in a form useful to American forecasters, making use of some of the more recent advances in upper air analysis. A few of the other papers in this collection include some consideration of North Africa as a borderline region to the Mediterranean. *Subject Headings:* **1. Synoptic studies 2. Northwest Africa I. Chicago. University, Department of Meteorology.**

3A–233 551.555.8

*Dubief, Jean, **Les vents de sable dans le Sahara français.** [Sandstorms in the French Sahara.] *Algiers, Université, Institut de Recherches Sahariennes, Travaux*, 2:11–35, **1943.** 5 charts, 4 figs., 4 tables, 11 refs. **NNA**—Author presents the essential results of a statistical summary of sandstorms in the Algerian Sahara made by the Institut de Météorologie et de Physique du Globe de l'Algérie. The phenomenon is described; variations noted, occurrences at night, duration, diurnal and annual variations; geographical distribution and frequency of wind directions, discussed. *Subject Headings:* **1. Sandstorms 2. Sahara Desert 3. Algeria.**

3A–234 551.582(66,65)

*Dubief, Jean and Lauriol, J., **Moyennes climatologiques du Sahara algérien pour la période 1925–1939.** [Climatological means of the Algerian Sahara 1925–1939.] *Algiers, Université,*

Institut de Météorologie et de Physique du Globe, Travaux, 1(4), **1943.** 69 p. of charts, 32 p. of tabl 22 p. text. 26 figs., refs. **NNA**—Monthly and annual means of climatic elements for numero stations in the Algerian Sahara for varying periods of time up to 15 years are tabulated. Includ are values for the usual elements, sandstorms and upper air winds. The numerous charts give thorough graphic presentation of the climatic elements, variations, distribution, etc. The text, DUBIEF, is entitled "Note on the subject of the climatology of the Sahara" and takes up the clima elements in greater detail, causes of particular climatic conditions, variations, etc. Included three more tables and numerous illustrative figures. Importance of further study is stresse *Subject Headings:* **1. Climatology 2. Sahara Desert 3. Algeria.**

3A–235 551.582(6

*France. Office National Météorologique. **Études climatologiques des provinces françaises Corse-Afrique du Nord, (Corse-Maroc-Algérie, Tunisie).** [Climatological studies of Fren provinces. Corsica-North Africa (Corsica-Morocco-Algeria, Tunisia).] Pt. 20. Paris. 194 147 p. map, tables. **DWB**—Recent observations of the usual elements, surface winds, visibili etc., from numerous stations of each country are tabulated in detail, accompanied by explanato text and map of stations of North Africa. *Subject Headings:* **1. Climatic data 2. Corsica Morocco 4. Algeria 5. Tunisia.**

3A–236 551.515.2:551.555.8(6

§Great Britain. Meteorological Office. **Atlas lee-depressions and their significance for sciroc** *Great Britain, Meteorological Office, Synoptic Div., Technical Memorandum* No. 43. **1943.** 23 p. 7 charts. Mimeographed. **GB-MO**—With a northwesterly circulation a trough develops to lee Atlas Mountains. If a cold front approaches, this trough deepens. If fronts exist over northe Sahara, independent Saharan depressions are formed, which bring deep hot Saharan air mass northward. When this air reaches the northern coast bad sirocco occurs. Statistics of ann variations are given and analyzed. Synoptic charts included. *Subject Headings:* **1. Cyclon 2. Sirocco 3. Atlas Mountains 4. Sahara Desert**—*C.E.P.B.*

3A–237 551.5

d'Hauteserre, Boulet, **Mesures hydrométriques à Tamanrasset.** [Hygrometric measureme at Tamanrasset.] *Algiers, Université, Institut de Météorologie et de Physique du Globe, Travau* 1(2):15–16, March **1943.** **NNA**—A series of absolute measurements with a hygrometer and t psychrometers taken in 1942–1942 to establish further values of humidity for region are discusse Followed by a discussion by J. LAURIOL (p. 17–18) with 19 graphs. He concludes that a gra system or systematic scale is necessary for analyzing psychrometric observations; that the formu of REGNAULT is acceptable for use, but that that of ANGOT is not for Sahara regions. *Subject Hea ings:* **1. Humidity 2. Psychrometric studies 3. Tamanrasset, Algeria. 4. Sahara Dese I. Lauriol, J.**

3A–238 551.582(66,6

Queney, Paul, **Types de temps en Afrique du Nord et au Sahara Septentrional.** [Types weather in North Africa and in the northern Sahara.] *Algiers, Université, Institut de Météorolo et de Physique du Globe, Travaux*, 1(3), **1943.**—Unchecked. *Subject Headings:* **1. Climatology Sahara Desert 3. Algeria.**

3A–239 551.577.

*Queney, Paul and Cuny, Marcel, **Étude sur les pluies torrentielles en Algérie.** [Study torrential rains in Algeria.] *Algiers, Université, Institut de Météorologie et de Physique du Gl Travaux*, 1(2):1–11, March **1943.** 12 charts, 4 diagrs., 2 tables. **NNA**—Study is based on 10 yea records (1929–1938) from 183 stations in northern Algeria and seven in northern Sahara. T rential rain is defined as a fall of at least 30 mm. in 24 hours. Tables give summary data. Cha show individual disturbances for various dates and various regions of Northwest Africa. *Subj Headings:* **1. Excessive rainfall 2. Algeria**

3A–240 551.57

*Roux, Georges. **Notice sur la carte de la moyenne annuelle des précipitations (années 192 1940).** [Note on the map of mean annual precipitation, 1926–1940.] *Société des Sciences N turelles du Maroc, Variétés Scientifiques*, No. 6, **1943.** 19 p. map, tables, refs. **NNA**—A la detailed rainfall map of Morocco is presented. Author discusses its construction and refers to predecessors. He includes tables of mean values of annual rainfall, 1926–1940, for numerous s tions. *Subject Headings:* **1. Precipitation 2. Morocco.**

3A–241 551.582:629.13(61)

*U. S. Hydrographic Office, **Naval air pilot Northwest Africa (including the Azores, Madeira and Canary islands); weather summary.** *U. S. Hydrographic Office, Publication* No. 260, *Supplement "B,"* **1943.** 209 p. 49 charts, 5 tables. **NNA**—Detailed study of the aviation climatology of the land and sea areas of this region is presented. Contents include consideration of the following: atmospheric pressure and its weather controls; marine meteorology including northeast trades, winds of lower western Mediterranean, cyclones and depressions of North Atlantic and of Mediterranean, thunderstorms, air temperatures at sea, precipitation, cloudiness, visibility, and tables and charts of marine meteorological data; island climates of Azores, Madeira and Canary Islands; coastal and continental meteorology, Atlantic coast winds; ocean areas off Morocco, Mediterranean coast winds, and climate of Algeria, Tunisia, western Libya; interior winds of NW Africa and consideration of each of the usual climatic elements for each country, Morocco, Algeria, Tunisia, Tripolitania, as well as of cloud, thunderstorm, visibility, haze and sandstorms, mirage and upper air winds, including many wind roses and data. Extensive meteorological tables for land stations and ocean areas are appended, giving means of long period observations. *Subject Headings:* **1. Aeronautical climatology 2. Pilot guides 3. Morocco 4. Algeria 5. Tunisia 6. Tripolitania 7. Madeira 8. Canary Islands 9. Azores.**

3A–242 551.582:629.13(61)

*U. S. Weather Bureau, **Air route weather summary; north coast of Africa.** *U. S. Weather Bureau, Special Report* No. 307, **1943.** 25 p. tables. **DWB**—Conditions on route Casablanca to Cairo via Tripoli, and Marrakech to Tripoli are discussed with outline summaries of terminal weather conditions at various points along the routes. Climatic data are appended for 13 points. *Subject Headings:* **1. Aeronautical climatology 2. Casablanca-Cairo air route 3. Marrakech-Tripoli air route 4. North Africa.**

1944

3A–243 551.582(61)

Ballert, C. G. and George, M. C., **Notes on the climate of the coastal fringe of North Africa.** *Journal of Geography,* 43:97–107, **1944.** map, diagr., 3 refs. **NN**—General description of climate of the coast of North Africa, given, from Mogador, Morocco, to Port Said, with a good diagrammatic map, but no tabulated data. *Subject Headings:* **1. Climatology 2. North Africa.**

3A–244 551.583:551.577.6

†Bois, Charles, **Années de disette, années d'abondance; sécheresses et pluies en Tunisie de 648 à 1881.** [Years of scarcity, years of abundance; droughts and rainfall in Tunisia from 648 to 1881.] *Revue pour l'Étude des Calamités,* 7(21):3–26, Jan.–Dec. **1944.** table, 48 refs. **NNA**—Years of drought and famine and years of rainfall and abundance determined through study of historical records, and attempt is made to find evidence of periodicities or system of climatic fluctuations as well as of any overall change of climate. No definite cycles could be established, not even any set relations with records of sunspot activity (after 1750). *Subject Headings:* **1. Historical climates 2. Climatic changes 3. Periodicities 4. Tunisia.**

3A–245 551.577:63

Bonjean, G., **Sur la possiblilité de prévision des récoltes en fonction de la pluviométrie.** [On the possibility of forecasting harvests according to rainfall.] *Société des Sciences Naturelles du Maroc, Bulletin,* 24:6–7, **1944.** 2 equations. **NNM**—Brief summary of verbal communications on harvest forecasting in Morocco. *Subject Headings:* **1. Agricultural climatology 2. Precipitation 3. Morocco.**

3A–246 551.509(262)

§Chicago, University, Dept. of Meteorology, **A report on synoptic conditions in the Mediterranean area.** *Chicago, University, Department of Meteorology, Miscellaneous Report* No. 14, **1944.** 113 p. 57 figs., 11 tables, refs. **DWB, NNA**—Series of six papers by members of the Institute on various aspects of synoptic conditions in all parts of the Mediterranean including the NW and NE coasts of Africa. Papers deal with: air masses of the Mediterranean; weather conditions in the Mediterranean region during period of high index over Europe; effect of northwest and of southwest flow pattern on the Mediterranean weather; and forecasting problems of Italy. *Subject Headings:* **1. Synoptic studies 2. Mediterranean 3. Northwest Africa 4. Northeast Africa.**

3A–247 551.577.2(66)

Dubief, Jean, **Note sur les pluies au Sahara central.** [Note on rainfall in the central Sahara.] *Algiers, Université, Institut de Météorologie et de Physique du Globe, Travaux,* 1(6):4–13, Oct. **1944.** map, refs. **NNA**—Author notes that since 1933 attempt has been made to record meteorological

elements at certain points in the Central Sahara, particularly rainfall. Records from different places for varying periods are summarized, discussed, and compared. Effects of amount of rain on pasturage in the various localities are particularly noted. *Subject Headings:* **1. Climatology 2. Precipitation 3. Sahara Desert.**

3A–248 551.582:629.1

France. Service Hydrographique, **Côte ouest d'Afrique. 1. Du Cap Spartel au Cap des Palmes Îles Açores, de Madère, Canaries et du Cap Vert; instructions nautiques.** [West Coast of Africa 1. From Cape Spartel to Cape Las Palmas, islands of Azores, Madeira, Canaries, and Cape Verde Sailing instructions.] *France, Service Hydrographique, Publications*, No. 416, **1944.** 439 p.—Unchecked. Meteorology, p. 2–40. Tables for Cape Spartel, Kenitra, Casablanca, Safi, Mogador Agadir. (Similar type of "sailing instructions" or "pilots" are put out by the United States and Great Britain.) *Subject Headings:* **1. Marine meteorology 2. Pilot guides 3. Climatology 3. West African Coast 5. Azores 6. Madeira 7. Canary Islands 8. Cape Verde Islands.**

3A–249 551.582(64

*Gendre, F., **Climatologie des villes du Maroc.** [Climatology of the cities of Morocco.] *Revue de Géographie Marocaine*, 28(4):13–16, **1944.** tables. **NNA**—Monthly means for rainfall and temperature, established from observations, 1928–1940, for 14 cities of Morocco, are tabulated and briefly discussed. *Subject Headings:* **1. Climatology 2. Urban climates 3. Morocco.**

3A–250 551.582(65

*Seltzer, P., **Esquisse climatologique de l'Algérie (période 1913–1938).** [Climatological sketch of Algeria, 1913–1938.] *Algiers, Université, Institut de Météorologie et de Physique du Globe, Travaux*, 1(5), March **1944.** 76 p. 32 charts, extensive tables. **NNA**—Work consists mainly of tables and of charts of isopleths, giving values of climatological observations kept at numerous meteorological stations of the "Institut" in northern Algeria, during the years 1913–1938. As well as regular climatic elements, the records include observations of snow, hail, close and distant thunderstorms, sirocco, white frost. Text gives a summary analysis and further comments on the charts and climatology of the region. *Subject Headings:* **1. Climatology 2. Climatic data 3. Algeria.**

1945

3A–251 551.582(65

Algiers. Université, Institut de Recherches Sahariennes, **Travaux.** Vol. 1, Nos. 1–7, **1943–1945.** (No. 3 missing.) **NNA**—Each work analyzed separately in the present bibliography. *Subject Headings:* **1. Climatology 2. Algeria.**

3A–252 551.582.1:551.555.8(661

*de Backer, S. M., **Les tempêtes de sable au Sahara; observations météorologiques à la station d'Ounianga-Kebir, du 23 janvier au 21 mars 1941.** [Sandstorms in the Sahara; meteorological observations at the Ounianga-Kebir stations, Jan. 23–March 21, 1941.] *Belgium, Institut Royal Météorologique, Mémoires*, Vol. 22, **1945.** 28 p. 5 figs., graphs, tables, 8 refs. **NN**—Sahara sandstorms are described in general, season, effects, visibility, etc. The origin of the sands is considered as well as wind and air mass conditions and atmospheric circulation in general. Topography of the Sahara is illustrated and discussed, including Ounianga-Kebir, 19°04′N., 20°27′E. Results and conclusions of upper air wind soundings are discussed and observations of cloud, haze, sandstorms, visibility and wind are tabulated as kept at this station Jan. 23–March 21, 1941. *Subject Headings:* **1. Climatology 2. Sandstorms 3. Sahara Desert 4. French Equatorial Africa.**

3A–253 551.57

*Javilliey, H., **Étude sur la répartition des précipitations en fonction de l'intensité à Alger.** [Study on the occurrence of precipitation with regard to the intensity at Algiers.] *Algiers, Université, Institut de Météorologie et de Physique du Globe, Travaux*, 1(7):14–17, Sept. **1945.** 2 figs. 3 tables. **NNA**—Amount of precipitation falling in each hour of rainfall is calculated for 1940–1942, from records kept in Algiers. Values are shown graphically and in tables. *Subject Headings:* **1. Precipitation 2. Algiers, Algeria.**

3A–254 551.58

Queney, Paul, **Classification aérologique des types de temps du Sahara français.** [Aerologic classification of weather types of the French Sahara.] *Algiers, Institut de Recherches Sahariennes, Travaux*, 3:13–26, **1945.** 6 figs., table, 5 refs. **NNA**—Author states that, because of the extensive military operations and aerological soundings during the war in the Sahara, information is at last available for making a comprehensive analysis of climatic types there. He describes the general circulation regimes over the region and lists, discusses and illustrates in the charts the princip

types influencing Sahara weather. *Subject Headings:* **1. Atmospheric circulation 2. Climatic types 3. Sahara Desert 4. Algeria.**

3A–255 551.556:511.311.31

Queney, Paul, **Observations sur les rides formées par le vent à la surface du sable dans les ergs sahariens.** [Observations of the ridges formed by the wind on the surface of the sand in the dunes of the Sahara.] *Annales de Géophysique*, 1(3):279–282, **1945.** 10 figs. **NNA**—Various types of formations discussed and illustrated with some brief explanation of the winds that cause them. *Subject Headings:* **1. Wind effects 2. Sand dunes 3. Sahara Desert.**

3A–256 551.582(642)

*Spain. Servicio Meteorológico Nacional, **Climatología de España. Calendario meteorológico fenológico, 1945.** p. 101–127. **DWB**—Includes monthly means, 1901–1930, of temperature, relative humidity, rainfall and days with cloud for Melilla, Tangier, Tetuán, Ceuta. (Later editions available.) *Subject Headings:* **1. Climatic data 2. Melilla, Spanish Morocco 3. Tangier, Morocco 4. Tetuán, Spanish Morocco 5. Ceuta, Spanish Morocco.**

3A–257 551.582:551.509.33(611)

U. S. Weather Bureau, **Weather guide for long range planning.** Washington, D. C., **1943–1945.** 2 Vols. charts, diagrs., maps, tables. **DWB**—A single folded sheet in Vol. 1 gives a graphical presentation of normal and abnormal weather in Tunis for use in estimating general conditions in the future. It may be considered a "statistical forecast" having a fair dependability in direct relation to the length and quality of the records, (in case of Tunis, fair) upon which it is based. Twelve years of record for general weather and 8 years of record for flying weather are used. Expectancy table is based on broken records 1887–1939. Surface wind roses, temperature and precipitation charts, included. *Subject Headings:* **1. Climatology 2. Long range forecasting 3. Tunis, Tunisia.**

1946

3A–258 551.589.1

Capot-Rey, Robert, **Études récentes sur le climat de l'Afrique du Nord et du Sahara.** [Recent studies on the climate of North Africa and of the Sahara.] **NNA**—As a result of new stations and military aerological soundings new air mass and frontal analyses are made of region, to explain the seasonal climatic elements. Resultant types of weather are noted and described. Precipitation is taken up separately and variations by area and season are discussed and shown on maps and graphs. *Subject Headings:* **1. Climatology 2. Precipitation 3. Sahara Desert 4. North Africa.**

3A–259 551.524.37

Roux, Georges, **La fréquence des gelées au Maroc.** [The frequency of frosts in Morocco.] Reprint from: *Fédération des Sociétés Savantes de l'Afrique du Nord, 4e Congrès, 1938.* Rabat, **1946.** 6 p. fig., table. **GB-MO**—Includes a monthly table of frequencies of minimum temperature below 0°C. at 29 stations up to 1250 m., chart and discussion. *Subject Headings:* **1. Frost 2. Morocco.**

3A–260 551.582(65)

†*Seltzer, P., **Le climat de l'Algérie.** [The climate of Algeria.] *Algiers, Université, Institut de Météorologie et de Physique du Globe, Travaux, Hors Série*, **1946.** 219 p. 2 maps, 53 figs., 56 tables, numerous refs. p. 212–218. **NN** Here is the most comprehensive and detailed study of Algerian climate found; the essentials are organized and analyzed, as extracted from the numerous different observational series on Algerian climate in the past 30 years. Each climatic element is taken up at length, thoroughly discussed with extensive observations tabulated. Included along with chapter on the usual elements are chapters on evaporation, solar and terrestrial radiation, cloud conditions, insolation, thunderstorms, sirocco, hail, snow, sleet and fog. The place of the climate of Algeria in the picture of North African climate as a whole is considered. An extensive bibliography is included, divided by subject as follows: periodicals, observational series and separate reports, general descriptions, regional works, and individual studies on medical climatology, precipitation, etc. and climatic changes. *Subject Headings:* **1. Climatology 2. Bibliographies 3. Algeria.**

3A–261 551.506.7(649)

Tenerife. Centro Meteorológico, **Boletín Mensual Climatológico.** Vol. 1–2, **1945–1946. DWB.** Vol. 3–4, **1947–1948.** Title varies. Unchecked.—With Vol. 2, No. 13 (Jan. 1946), partial I.C.A N. summaries include cloud types and heights, visibility, surface wind frequencies. Vol. 2, No. 21 also contains notes and tabulated means for the usual elements. *Subject Headings:* **1. Climatic data 2. Canary Islands. I. Spain. Servicio Meteorológico Nacional.**

1947

3A–262 551.582(64)

Bidault, G., **Les éléments du climat d'Azrou.** [Elements of the climat of Azrou.] *Maroc Médical*, 26(264):65–69, **1947.** 3 figs., 7 refs. **DSG**—Climatic characteristics of Azrou in the Central Atlas are summarized. Pressure, temperature, snow, thunderstorms and hail, nebulosity, fog, humidity, winds, sirocco and chergui, and insolation are briefly reviewed. Some schematic diagrams are included but no tabulated data. *Subject Headings:* **1. Climatology 2. Azrou, Morocco.**

3A–263 551.515.3(611)

Bois, Charles, **Les trombes en Tunisie.** [Whirlwinds in Tunisia.] *Revue pour l'Étude des Calamités*, 10:21–26, **1947.** refs. **DWB**—A series of brief descriptions of individual occurrences 1898–1946. *Subject Headings:* **1. Whirlwinds 2. Tunisia.**

3A–264 551.521

Debrach, J., **Documents sur le rayonnement solaire en Afrique du Nord.** [Works on solar radiation in North Africa.] *Maroc Médical*, 26(264):45–49, **1947.** 6 figs., table, 15 refs. **DSG**—Radiation conditions in various parts of North Africa, mostly Morocco, are reviewed for doctors and hygienists. Curves show comparisons in solar radiation values of various North African stations with several stations of Europe. *Subject Headings:* **1. Solar radiation 2. Morocco 3. North Africa 4. Europe.**

3A–265 551.586:615.8

Diot, — and Accart, —, **Marrakech—station climatique d'hiver.** [Marrakech—climatic winter station.] *Maroc Médical*, 26(264):59–64, **1947.** 5 figs., 17 refs. **DSG**—General climatic conditions at Marrakech are reviewed and summarized in diagrams, including wind roses for the two main seasons. Favorable effects of the winter climate, Oct.–May, on many diseases are pointed out. *Subject Headings:* **1. Climatology 2. Medical climatology 3. Marrakech, Morocco.**

3A–266 551.543.1

Font Tullot, Inocencio, **La variación diurna de la presión atmosferica en el Observatorio de Izaña (Tenerife).** [Diurnal variation of atmospheric pressure at the Izaña Observatory, Tenerife.] *Revista de Geofisica*, Madrid, 6(23):450–457, July–Sept. **1947.** 3 figs., 2 tables. **DLC**—Analysis is made of diurnal curves of atmospheric pressure based on observations at Izaña, 1916–1935. Table gives monthly normals of diurnal pressure variations. *Subject Headings:* **1. Diurnal pressure variations 2. Izaña, Canary Islands 3. Tenerife, Canary Islands.**

3A–267 551.552

Fourey, Albert and Cuny, Marcel, **Répartition du vent sur le plateau de Rass Asfour (Atlas Oranais).** [Wind distribution on the plateau of Rass Afour (Oran Atlas).] *Annales de Géophysique*, 3(2), **1947.** Notes de Laboratoires, p. 1–3, 2 figs., 3 tables. **GB-MO**—A survey of wind velocity was carried out to determine best site for a climatic station. Contours and wind isopleths given. *Subject Headings:* **1. Winds 2. Rass Asfour, Atlas Mountains 3. Algeria.**

3A–268 551.577.39

*Roux, Georges, **La variation annuelle des précipitations au Maroc.** [Annual variation of precipitation at Morocco.] *Société des Sciences Naturelles du Maroc, Bulletin*, 15–17:309–327, **1945–1947.** 6 figs., 4 fold. maps, 2 tables, 7 refs. **NNM**—The four charts show precipitation distribution by season. A comprehensive discussion of the rainfall regime of Morocco is given, and mean seasonal and mean monthly values, 1926–1940, for precipitation at numerous stations of Morocco are tabulated. *Subject Headings:* **1. Precipitation 2. Morocco.**

1948

3A–269 551.582(64)

†Bidault, G. and Debrach, Jean, **Physique du globe et météorologie au Maroc; état de nos connaissances en 1947.** [Physics of the globe and meteorology of Morocco; state of our knowledge in 1947.] (In: Société des Sciences Naturelles du Maroc, **Volume Jubilaire, 1920–1945.** Rabat, Paris, London, **1948.** p. 55–94. 5 plates, tables, 75 refs. on climate). **NNM**—Summary is made of work done up to 1945 on geophysics and meteorology in Morocco. Chapters take up atmospheric circulation, the usual climatic elements with illustrative charts and some brief summary tables, as well as elements of fog, mist, evaporation, and radiation. Pages 82–87 deal with physics of the earth. An excellent list of references on meteorology in Morocco (in chronological order, beginning with 1930) is appended. *Subject Headings:* **1. Climatology 2. Geophysics 3. Morocco 4. Société des Sciences Naturelles du Maroc.**

3A–270 551.555.8

Bochet, R., **Les tempêtes de sable en Oranie.** [The sandstorms in Oran.] *La Météorologie*, 4th Ser., No. 12:251–277, Oct.–Dec. **1948.** 12 figs., tables, 8 refs. **DWB**—Synoptic and aerological conditions attending various types of sandstorms in Algeria. *Subject Headings:* **1. Sandstorms 2. Weather forecasting 3. Sferics 4. Oran, Algeria.**—*M.R.*

3A–271 551.577

§Font Tullot, Inocencio, **El régimen de lluvias del Sáhara Español.** [Rainfall regime of the Spanish Sahara.] *Revista de Geofisica*, Madrid, 7(28):380–393, Oct.–Dec. **1948.** 3 figs., table. **DLC**—General characteristics of the region's rainfall are noted; mean monthly values, 1943–1947, are briefly tabulated for Cabo Juby, Villa Cisneros and Smara; meteorological causes of the rain and the synoptic conditions attending it are analyzed. *Subject Headings:* **1. Precipitation 2. Spanish Sahara.**

3A–272 551.555.3

Font Tullot, Inocencio, **Vientos catabaticos en Sidi-Ifni.** [Catabatic winds in Sidi-Ifni.] *Revista de Geofisica*, Madrid, 7(27):274–281, July–Sept. **1948.** 6 figs., ref. **DLC**—Characteristics, local causes and attending meteorological conditions of the catabatic winds in Spanish Morocco on the southwest end of the Atlas Mountains are discussed. *Subject Headings:* **1. Katabatic winds 2. Sidi-Ifni, Spanish Sahara.**

3A–273 551.582:629.12(262)

*France. Service Hydrographique. **Instructions nautiques. Mer Méditerranée. France (côte sud), Corse, Maroc (côte nord), Algérie, Tunisie.** [Sailing directions for the Mediterranean. France (south coast), Corsica, Morocco (north coast), Algeria, Tunisia.] *France, Service Hydrographique, Publications*, No. 426:3–39, **1948. DLC**—Unchecked. Similar type "pilots" for Mediterranean are put out by the United States and Great Britain. *Subject Headings:* **1. Marine meteorology 2. Pilot guides 3. Climatology 4. France 5. Corsica 6. Morocco 7. Algeria 8 Tunisia 9. Mediterranean.**

3A–274 551.509.33

Petitjean, Lucien. **Sur le prévision des périodes sèches et pluvieuses en Algérie.** [On the forecasting of dry and rainy periods in Algeria.] *Académie des Sciences, Paris, Comptes Rendus*, 226:194–195, Jan. 12, **1948.** ref. **NN**—Shows trends and forecasts up to 1952. *Subject Headings:* **1. Long range forecasting 2. Algeria.**

3A–275 551.582:629.13(64)

Spain. Servicio Meteorológico Nacional, **Climatologia aeronautica de España.** [Aeronautical climatology of Spain.] *Spain, Servicio Meteorológico Nacional, Publicación, Ser. D.*, No. 6, **1948.** 119 p. chiefly figs. and tables. **DWB**—A map shows the location of the 35 stations in Spain, Morocco, the Balearic Islands and the Canaries; and a table gives the coordinates and height of the stations for which seasonal frequencies of visibility, cloud height, wind speed and direction, and state of the sky and weather are presented tabularly and graphically. The charts and tables are based on an analysis of 6500–7500 thrice-daily observations at each airport or observatory for the period 1940–1947. The seasonal and annual wind roses are also presented on folding maps of the entire area. No upper air data are given. *Subject Headings:* **1. Aeronautical climatology 2. Spain 3. Spanish Morocco 4. Balearic Islands 5. Canary Islands.**—*M.R.*

1949

3A–276 551.577.36

*Berkaloff, E. et al., **Fréquence des pluies en Tunisie.** [Frequency of rain in Tunisia.] *Tunis, Service Météorologique*, Fasc. 1, **1901–1925.** 39 p. Fasc. 2, **1926–1945.** 39 p. Fasc. 3, **1901–1945.** 39 p. Fasc. 4, **1901–1945.** 43 p. tables, 3 refs. [Jan. 18, **1949.**] **DLC**—Beginning in 1925, Charles Bois compiled data for rainfall stations in Tunis and in 1938, 1939 and 1940 published three works on frequency of torrential rains in Tunis. The work was continued by his successors to include non-torrential rain, the result being a series of statistical publications of which these are the first four. Frequencies of rains a) within certain class limits and b) exceeding certain values, expressed in days per month, are presented for 1901–1925, 1925–1945, and 1901–1945, respectively in the first three volumes, for the 40 principal stations in Tunisia. The fourth volume gives the frequencies (in actual and in percentage values exceeding the limits given above, as well as 200, 300, 400 and 600 mm./month) for monthly and annual (classes 0 to 2,000 mm.) rainfall at the same stations for 45 years when available (in some cases as few as 40 or even 36 years of record are used). *Subject Headings:* **1. Rainfall frequencies 2. Tunisia.**—*M.R.*

3A–277 551.583:551.577.6(64)

†Bois, Charles, **Années de disette, années d'abondance; sécheresses et pluies au Maroc.** [Years of scarcity, years of abundance; droughts and rainfall in Morocco.] *Revue pour l'Étude des Calamités*, 11(26–27):33–71, Jan. **1948**–Dec. **1949.** 3 tables, 99 refs. **NNA**—A survey is made, going back to the 9th century, of records of famine and drought or of abundance to determine whether there have been systematic variations in the climate of Morocco or definite periodicities in meteorological phenomena and whether the climate has remained relatively stable beyond the periodic variations. Author concludes that no simple laws can be established. Brief tables summarize determinations of drought, epidemics, grasshoppers, etc. in Morocco and Tunisia. A list of references, mostly histories and expedition accounts, chronologically arranged since the 10th century, is included. *Subject Headings:* **1. Historical climates 2. Climatic changes 3. Periodicities 4. Morocco.**

3A–278 551.576(64):629.13

Charl, P., **Les stratus d'Agadir.** [Stratus at Agadir.] *La Météorologie*, 4th Ser., 14:107–111, April–June **1949.** 4 figs., 2 refs. English summary. **DWB**—Charts (based on three years data) show hourly and monthly frequencies of stratus with ceilings $\leqslant 400$ m. compared with time of sunrise and frequency of winds $\geqslant 7$ m./s. Diurnal circulation scheme on days with and without stratus discussed and illustrated schematically with respect to airport, hills and sea. Advection stratus (ceilings 30–50 m.), although less frequent than radiation stratus, occurs $>20\%$ of the time in July, sometimes persists for hours and is very dangerous for aviation. *Subject Headings:* **1. Stratus clouds 2. Aeronautical climatology 3. Agadir, Morocco.**—*M.R.*

3A–279 551.579

Coutagne, Aimé, **En marge de quelques documents récents concernant l'hydrologie Algérienne.** [Notes on some recent documents concerning the hydrology of Algeria.] *Revue Générale de l'Hydraulique*, No. 50:3–7, March–April, **1949.** Reprint. **DWB**—Notes on: 1) "Hydrologie Algérienne," a summary of rain and river observations 1924–1946, in 15 Algerian basins (with formulas relating runoff to rainfall); 2) "Annuaire hydrologique," No. 1, 1946–1947; 3) "Les problèmes de l'eau en Algérie," a study of Algerian geology, meteorology and hydrology. *Subject Headings:* **1. Hydrology 2. Precipitation 3. Algeria.**—*C.E.P.B.*

3A–280 551.511 551.515.3

*El-Fandy, M. G., **Dust—an active meteorological factor in the atmosphere of northern Africa.** *Journal of Applied Physics*, 20(7):660–666, July, **1949.** 6 figs., 4 tables, 12 refs., 13 equations, append. **DLC**—A theoretical discussion of the role of dust particles in the turbulent transfer of heat and moisture, in the development of convection, and in the upsetting of radiation balance and thus modifying the air masses over desert regions. Data obtained in Egypt and North Africa are used to support theory. Rate of settling, effect on visibility, transfer of dust up to 3,000 ft. or more by ordinary surface winds, etc., taken into consideration. It is stated that the dust carries heat aloft and creates its own convection by giving up heat rapidly to surrounding air, and by absorbing direct and scattered radiation. *Subject Headings:* **1. Dust storms 2. Turbulent exchange 3. Radiation balance 4. North Africa 5. Egypt.**—*M.R.*

3A–281 551.582

*§Font Tullot, Inocencio, **El clima del Africa Occidental Espanola.** [Climate of Spanish West Africa.] *Spain, Servicio Meteorológico Nacional, Publicación, Ser. A, Memorias*, No. 21, **1949.** 88 p. 27 figs., 4 tables, refs. **DWB**—Results are presented of a series of regular meteorological observations made, 1941–1947, at the first order stations of Sidi-Ifni, Cabo Yubi, Villa Cisneros, and Smara, in Spanish West Africa. Contents include chapters on each of the usual climatic elements including particular weather phenomena of region; discussion of principal weather types on the whole, and climate of territory of Ifni in particular. Numerous diagrams and graphs illustrate climatic features. Mean values are summarized in appended tables. *Subject Headings:* **1. Climatology 2. Sidi-Ifni, Spanish Sahara 3. Cabo Yubi, Spanish Sahara 4. Villa Cisneros, Spanish Sahara 5. Smara, Spanish Sahara.**

3A–282 551.557:551.588.2(649)

*Font Tullot, Inocencio, **Regimen de vientos superiores en Tenerife.** [The winds aloft at Tenerife.] *Revista de Geofisica*, Madrid, 8(32):486–506, Oct.–Dec. **1949.** 6 figs., 2 tables, refs. **DWB**—Cloud and surface observations made at an observatory 7000 ft. above sea level (Las Canadas del Teide) from 1909–1915 and pilot balloon observations made at Izaña from 1916–1934 are analyzed to give seasonal wind roses up to 10 km. Discussion included concerning the air circulation around and above Tenerife. (*Same abstract* as 2.5–116 in May 1951 *Meteorological Abstracts.*) *Subject Headings:* **1. Upper air winds 2. Orographic influences 3. Wind roses 4. Tenerife, Canary Islands.**

3A–283 551.577.2:58(611)

Gaussen, Henri. **Les essences forestières et la pluviosité en Tunisie.** [Natural forests and rainfall in Tunisia.] (In his: **Travaux Botaniques dediés à René Maire.** Algiers, 1949. p. 127–136. 2 maps.) **NNA**—The importance of rainfall amount to variations in vegetation types in Tunis is emphasized. One map shows mean annual rainfall; another distribution of natural forests. Various regions are discussed separately, giving mean annual amount of rainfall for numerous places in each. *Subject Headings:* **1. Precipitation 2. Bioclimatology 3. Forests 4. Tunisia.**

3A–284 551.582:629.13

*Great Britain. Meteorological Office. **Aviation meteorology of the route Marseilles-Castel Benito.** *Great Britain, Meteorological Office, Meteorological Report,* 1,4), **1949.** 42 p. 9 figs., 5 tables, plus 5 appended tables, 7 refs. M.O. 496d. **DWB**—Region includes the Central Mediterranean, northern tip of Africa, Gulf of Gabes to Castel Benito, Tripolitania. First part of work takes up synoptic meteorology, that is, the various factors which control the weather over the air route as a whole and the types of weather which affect it. The second part, entitled "Climate," discusses the individual weather elements and is supplemented by climatological tables. Wind roses and rainfall maps are included. *Subject Headings:* **1. Aeronautical climatology 2. Synoptic studies 3. Marseilles-Castel Benito air route 4. Tripolitania.**

3A–285 551.521.4

Richter, N., **Bestimmungen des nächtlichen Transmissionskoeffizienten der Atmosphäre in der Libyschen Sahara und an der Küste Tripolitaniens.** [Determinations of the nocturnal transmission coefficients of the atmosphere in the Libyan Sahara and on the coast of Tripolitania.] *Zeitschrift für Meteorologie,* 3(10):309–312, Oct. **1949.** 4 tables, 4 refs. **DLC**—Observations of extinction on eight nights, star on horizon against zenith star, by HOFFMEISTER's mirror method gave transmission coefficients about 0.77 in Tripoli and 0.83 in Sahara, but in a moderate sandstorm only 0.54. Compared with similar observations elsewhere, Tripoli is suitable for astronomical observations, taking into account also mean cloudiness and humidity, but not with instruments effected by changes of temperature. *Subject Headings:* **1. Transmission coefficients 2. Light of the night sky 3. Sahara Desert 4. Tripolitania 5. Libya.**—*C.E.P.B.*

3A–286 551.506:551.521.1:551.573(611)

*Viguier, Louis, **Actinométrie, insolation, évaporation; période 1927–1948.** [Actinometry, insolation, evaporation; period 1927 1948.] Tunis, Service Météorologique **1949.** 12 p. 12 tables. **MH-BH**—A mimeographed statistical summary of observations made at Tunis during a period of 22 years. Includes monthly total, maximum and mean values of solar radiation, expressed in cm^3 of alcohol condensed (Six and Ballini instruments); of insolation made with a Campbell-Stokes sunshine recorder (hours month); and of evaporation (mm) made with a Piche evaporimeter. *Subject Headings:* **1. Actinometric data 2. Sunshine data 3. Evaporation data 4. Tunis, Tunisia.**—*M.R.*

1950

3A–287 551.583.2:633(611)

†Bois, Charles, **Les vicissitudes des cultures et le climat de la Tunisie dans l'histoire.** [Changes in agriculture and the climate of Tunisia in history.] *La Météorologie,* 4th Ser., No. 18:111–116. April–June **1950.** 31 refs. French, English and Spanish summaries. **DWB**—Historical and literary sources indicate that sugar cane, cotton, indigo, bananas, etc. were cultivated in Tunisia during some of the centuries since A.D. 900, and not during others, giving a clue to climatic changes. However, changes have not been severe. *Subject Headings:* **1. Climatic variations 2. Agriculture 3. Tunisia.**—*M.R.*

3A–288 551.573

††*Dubief, Jean, **Évaporation et coefficients climatiques au Sahara.** [Evaporation and climatic coefficients in the Sahara.] *Algiers, Université, Institut de Recherches Sahariennes, Travaux,* 6:13–44, **1950.** 2 figs., 4 charts, table, 25 refs., equations. **NNA**—Thorough study of evaporation in the Sahara of north and south Algeria, south Tripolitania and French West Africa. Theoretical aspects are discussed as well as actual observations, methods, etc., and results, variations, distribution, etc. Climatic coefficients that do and do not utilize evaporation are discussed and criticized. *Subject Headings:* **1. Evaporation 2. Climatology 3. Sahara Desert 4. Algeria.**

3A–289 551.5:629.13

*Great Britain. Meteorological Office. **Aviation meteorology of the route Castel Benito—Cairo.** *Great Britain, Meteorological Office, Meteorological Reports,* 1(5), **1950.** 46 p. maps, 9 figs., numerous tables, 12 refs. **NNA**—The first section, on synoptic meteorology, discusses the various factors controlling the weather over the route as a whole and types of weather affecting this route. The second

part describes the climate of summer and winter separately for each major section of the air route. Appended tables give values at different places along the route for general climatic elements; percentage frequency of occasions of visibility within certain ranges; percentage frequency of height of cloud base within certain ranges; percentage frequency of upper air wind speed and direction within certain ranges; and mean and extreme upper air temperatures. A small table gives percentage frequencies of red and green flying fitness. (*Same abstract* as 2J–242 in Oct. 1951 *Meteorological Abstracts.*) *Subject Headings:* **1. Aeronautical climatology 2. Synoptic meteorology 3. Castel Benito-Cairo air route 4. Tripolitania 5. Libya 6. Egypt.**

3A–290 551.577.3(65)

Isnard, Hildebert, **La répartition saisonnière des pluies en Algérie.** [Seasonal distribution of rainfall in Algeria.] *Annales de Géographie*, Paris, 59:354–361, Nov.–Dec. **1950.** 3 figs., table, 2 refs. **NNA**—Differences in the seasonal distribution of rainfall in the various parts of Algeria are noted. For example, the coast receives all its rain in the winter, while the interior receives its small amount throughout all seasons. Small graphs, map and table illustrate seasonal distribution of rain by region. *Subject Headings:* **1. Precipitation 2. Algeria.**

3A–291 551.555.8

§Lunson, E. A., **Sandstorms on the northern coasts of Libya and Egypt.** *Great Britain, Meteorological Office, Professional Notes*, No. 102, **1950.** 12 p. 8 figs. M.O. 524b. **MH-BH**—The worst sandstorms occur between Oct. and early June at fronts in "khamsin" depressions traversing north coast of Africa. The general characteristics and effect on airfields are described. The khamsin depression of March 23–25, 1942, is analyzed with synoptic charts, thermograms and hygrograms. *Subject Headings:* **1. Sand storms 2. Khamsin 3. Aeronautical climatology 4. Libya 5. Egypt.**

3A–292 551.515

§Vuorela, Lauri A., **Synoptic aspects of tropical regions of the Atlantic Ocean, West Africa and South America.** Helsinki, **1950.** 130 p. 46+figs., 10 tables, 32 refs., append. **DWB**—Research is founded on material originally collected by a Finnish aerological expedition during its voyage from western Europe to Buenos Aires and back, autumn of 1939. Writer attempts to complete the aerological material that was collected with all synoptic data available concerning Middle and South Atlantic as well as West African and South American areas. Some tabulated data and numerous synoptic charts are included. Conclusions are drawn with regard to disturbances in the easterlies, flow patterns, and other properties of the field of motion over the tropical Atlantic and synoptic patterns of South America. (*Same item* as No. 2.4–27 in April 1951 *Meteorological Abstracts.*) *Subject Headings:* **1. Synoptic studies 2. West Africa 3. South America 4. Atlantic Ocean.**

1951

3A–293 551.586:63

Lautensach, Hermann, **Klima und Pflanzenkleid Madeiras, im Wandel der Jahreszeiten.** [Climate and vegetation in the course of a year at Madeira.] *Kosmos*, Stuttgart, 47(1):27–32, Jan. **1951.** 8 photos. **NNA**—Popular descriptive article discusses climate and agriculture of the islands including photographs (three in color) of countryside. No data. *Subject Headings:* **1. Agricultural climatology 2. Madeira.**

3A–294 551.506.1(66,65)

*Algiers. Université, Institut de Météorologie et de Physique du Globe, **Bulletin Mensuel (Sahara), 1915–** Title varies, and: *Tamanrasset, Algeria, Observatoire Jules Carde*, **Données Climatologiques** (published as annual volume of **Bulletin Mensuel**, in two parts). diagrs., tables. (missing: 1933, '35, '36). Publication continues. **DWB**—Detailed climatological data published by months for each year; diagrams included. *Subject Headings:* **1. Climatic data 2. Sahara Desert 3. Algeria.**

3A–295 551.506.1(66,65)

*§Algiers. Université, Institut de Météorologie et de Physique du Globe, **Annuaire Météorologique et Géophysique . . . 2nd Ser., Sahara** and **Algérie du Nord. 1938–1948–. NNA, DWB**—The Sahara series contains three main parts; the first consists of climatological tables giving monthly means for some 38 first order stations in the Sahara of usual climatic elements; the second, complementary observations made at Tamanrasset of usual elements, surface and upper air winds, insolation, visibility, actinometry and terrestrial magnetism, also geothermometric values for Beni-Ounif (Ain Sefra); the third section contains notes by J. Dubief on rainfall of the Sahara with charts and often meteorological papers by other authors (some of which are annotated by author and date in the present bibliography). The Algérie du Nord series is a similar presentation of data and notes for

Northern Algeria. *Subject Headings:* **1. Climatic data 2. Climatology 3. Desert Sahara 4. Algeria. I. Dubief, Jean.**

3A–296 551.5:016(611)

†Algiers. Université, Institut de Recherches Sahariennes, **Bibliographie; lists des travaux publiés sur le Sahara au cours des années. . . .** [Bibliography; list of works published on the Sahara in the years. . . .] (In successive issues of: *Algiers, Université, Institut de Recherches Sahariennes, Travaux*, Vols. 1–6–, **1942–1950–. NNA**—Section of the list entitled "Meteorologie" lists alphabetically by author recent publications on subject. Lists are relatively brief and nowhere near cover the numbers of works available for the region. (No reference to meteorology in Vol. 1.) *Subject Headings:* **1. Bibliographies 2. Climatology 3. Sahara Desert 4. Algeria.**

3A–297 551.582 551.506.1(64)

†*Rabat, Morocco. Institut Scientifique Chérifien, Service de Physique du Globe et de Météorologie, **Annales, 1934–1942. DWB, DLC**—Meteorological observations for each year at numerous stations in Morocco are tabulated in detail. Rainfall and temperature charts are appended. General analysis of each year's weather in Morocco is given in text, by G. Bidault. Notes on various particular elements by J. Debrach and G. Roux are also included. Each number contains an index. *Subject Headings:* **1. Observational data 2. Climatology 3. Morocco. I. Bidault, G. II. Debrach, Jean III. Roux, Georges.**

3A–298 551.506.1(648)

Sidi Ifni. Ministerio del Aire, Servicio Meteorológico, **Boletin Mensual Climatológico.** Sidi Ifni, **1947. GB-MO**—Unchecked. *Subject Headings:* **1. Observational data 2. Sidi Ifni, Spanish Sahara.**

SUPPLEMENTARY MATERIAL

3A–299 551.576.31

*Barasoain Oderiz, José Antonio, **El mar de nubes en Tenerife.** [The sea of clouds at Tenerife.] *Spain, Servicio Meteorologico Nacional, Publicación, Ser. A*, No. 13, **1943.** 21 p. 10 figs., table. **DWB**—A thermodynamic as well as statistical study of conditions attending a peculiar StCu cloud deck in the vicinity of Tenerife. Observations were made at Izaña Observatory at 2367 m and other places. The stratocumulus deck varies in height above the sea with time of day, season and air mass conditions. These are all analyzed. A table gives monthly means for 3 times a day and for the day, from Nov. 1938 to Oct. 1939, of the temperature gradient between Santa Cruz and Izaña and the average height of the StCu deck. Also the average height of the clouds at 7, 13 and 18 h is given. *Subject Headings:* **1. Stratus forecasting 2. Stratocumulus decks 3. Cloud height 4. Tenerife, Izaña Observatory 5. Canary Islands.**—*M.R.*

3A–300 551.577(64)

Debrach, Jean, **Pluie, orages, grêle et neige au Maroc.** [Rain, thunderstorms, hail and snow in Morocco.] *La Terre Marocaine*, Casablanca, No. 209:127–132, **1947.** 2 figs., tables, 11 refs. **DA**—Rainfall distribution (9 localities) is given in histogram for each month of the year and the annual amount of rain for 1926–1940. Distribution and frequencies of thunderstorms and snow for the four seasons in the year are presented in tables. *Subject Headings:* **1. Precipitation 2. Morocco.**—*W.N.*

3A–301 551.509.532

Debrach, Jean, **La prévision des gelées au Maroc.** [Forecasting frosts in Morocco.] *La Terre Marocaine*, Casablanca, 18:57–60, **1948.** 2 figs., table, 10 refs. **DA**—A table presents mean and absolute minimum temperature for Dec., Jan., Feb. and March. A chart presents frequency of frost. A graph gives minimum temperatures for Casablanca, Rabat, Port-Lyautey, Meknes, Marrakech, Mazagan and Taroudant. *Subject Headings:* **1. Frost forecasting 2. Temperature 3. Morocco.**—*W.N.*

3A–302 551.583.2:599.9

Robert, Jean-Baptiste, **À propos de l'évolution du climat en Afrique du Nord depuis le début de la période historique.** [On the evolution of the climate in northern Africa since the beginning of the historical period.] *Revue de Géographie de Lyon*, 25(1):53–56, **1950.** 3 refs. **DWB**—A review of articles by M. Baudy "Considérations sur l'évolution du climat en Afrique du Nord et en particulier au Maroc, depuis la période préhistorique." On the basis of analysis of charcoal of paleolithic time, Baudy concluded that the forest species have not changed and that the climate has remained relatively the same since 2500 B.C. Local climatic changes have occurred as a result of the encroachment of the desert and human activity. *Subject Headings:* **1. Historical climates 2. Climatic changes 3. Morocco 4. North Africa. I. Baudy, M.**—*I.L.D.*

PART III. METEOROLOGICAL ARTICLES APPEARING IN RECENTLY ISSUED PUBLICATIONS

Note: The contents of periodicals included in this section are for information only, and will not be listed on either the author or subject indexes until abstracted. When material is furnished in advance of date of publication, the pagination may be omitted.

Akademiia Nauk, SSSR, Institut Geografii, Trudy, Volume 48, **Voprosy Klimatologii,** 1950.

Baĭbakeva, E. M.: **Dinamika mestnoĭ pogody pri kholodnykh vtorzheniiakh v dolinakh rek Rioni i Kury zimoĭ i letom,** [Dynamics of local weather during cold intrusions in the valleys of Rion and Kura in winter and summer], p. 3–31.

Baranov, A. I.: **Klimaticheskie vremena goda v Evropeĭskoĭ chasti SSSR,** [Climatic seasons in European USSR], p. 32–48.

Klimenko, L. V.: **Izmenenie mestnoĭ pogody pri transformatsii vozdushnykh mass letom i zimoĭ na ravnine Kazakhstana,** [The change of local weather during transformation of air masses in summer and winter on the plains of Kazakhstan], p. 49–62.

Fedorov, E. E.: **Mestnaia pogoda i ee rol' pri izuchenii klimaticheskikh usloviĭ na poverkhnosti zemli,** [Local weather and its role in the study of climatic conditions on the earth's surface], p. 63–70.

Fedorov, E. E.: **Izmenenie v tipakh mestnoĭ pogody v kontinental'noĭ tropicheskoĭ vozdushnoĭ masse v letnie mesiatsy na ee puti s iuga-vostoka i iuga k Moskve,** [Change in the types of local weather in continental tropical air masses during summer on its trajectory from southeast and south to Moscow], p. 71–87.

Fel'dman, IA. I.: **K voprosu o vliianii lesnykh ploshchadeĭ na obrazovanie mestnoĭ pogody v taezhnoĭ zone Evropeĭskoĭ chasti SSSR,** [On the influence of forests on the formation of local weather in the taiga zone of European USSR], p. 88–95.

Fel'dman, IA. I.: **Rol' oazisov i pustyn' Sredneĭ Azii v formirovanii mestnoĭ pogody s sukhoveem,** [The role of oases and deserts of Central Asia in the formation of local weather with (hot) dry winds], p. 96–102.

Fel'dman, IA. I.: **Nekotorye rezul'taty po issledovaniiu vliianiia ravninnogo rel'efa na letnie osadki,** [Some results of research on the influence of plain relief on summer precipitation], p. 103–109.

American Meteorological Society, Bulletin, Volume 32, Number 8, October 1951.

Williams, Philip, Jr.: **The use of confidence factors in forecasting,** p. 279–281.

Sparkman, J. W., Jr.: **Geomagnetic conditions and anticyclonic development,** p. 282–288.

Bunting, Donald C. and Latour, Marinus H.: **Radar-rainfall studies in Ohio,** p. 289–294.

Huff, F. A. and Stout, G. E.: **A preliminary study of atmospheric-moisture—precipitation relationships over Illinois,** p. 295–297.

Widger, William K., Jr. and Palmer, Thomas Y.: **A method for using international business machines test sheets for student forecasting and verification,** p. 298–301.

Gill, Gerald C.: **A low-pressure hydrogen generator for use in filling radiosonde balloons,** p. 302–307.

Fergusson, S. P.: **Nephoscopes (II),** p. 308–313.

Ashburn, Edward V.: **On the prospects for routine optical soundings in the stratosphere,** p. 313.

Court, Arnold: **Bursting of frozen balloons,** p. 313–314.

American Meteorological Society, Bulletin, Volume 32, Number 9, November 1951.

Baur, Franz: **The significance of anomalies of atmospheric circulation over the North Atlantic and November with regard to the temperatures of the following winters in New England,** p. 319.

Cressman, George P.: **The development and motion of typhoon "Doris," 1950,** p. 326.

Cunningham, Robert M.: **Some observations of natural precipitation processes,** p. 334.

Horn, John D.: **On irregular movements of tropical cyclones in the Pacific,** p. 344.

Gilmore, Marion H.: **Frontal microseisms,** p. 346.

ournal of Geophysical Research, Volume 56, Number 2, June 1951.

Reich, H.; Foertsch, O. and Schulze, G. A.: **Results of seismic observations in Germany on the Heligoland explosion of April 18, 1947,** p. 147–156.

Baule, Heinrich: **Seismische Geschwindigkeitsmessung im Karbongestein unter Tage,** Seismic velocity measurements in subterranean carbon bearing rocks, p. 157–161.

Dickson, David V.: **Nomogram and slide-rule for solution of spherical triangle problems found in radio communication,** p. 163–175.

Ferraro, V. C. A.; Parkinson, W. C. and Unthank, H. W.: **Sudden commencements and sudden impulses in geomagnetism: their hourly frequency at Cheltenham (Md.), Tucson, San Juan, Honolulu, Huancayo, and Watheroo,** p. 177–195.

Hines, C. O.: **Wave packets, the poynting vector, and energy flow: Part II—Group propagation through dissipative isotropic media,** p. 197–206.

Hines, C. O.: **Wave packets, the poynting vector, and energy flow: Part III—Packet propagation through dissipative media,** p. 207–220.

Peterson, Allen M.: **The mechanism of F-layer propagated back-scatter echoes,** p. 221–237.

Seeger, Charles L.: **Some observations of the variable 205 Mc/sec radiation of Cygnus A,** p. 239–258.

Price, A. T. and Wilkins, G. A.: **The daily magnetic variations in equatorial regions,** p. 259–263.

Singer, Fred S.; Maple, E. and Bowen, W. A., Jr.: **Evidence for ionosphere currents from rocket experiments near the geomagnetic equator,** p. 265–281.

Nagata, Takesi: **A reply to the comment by Prof. Ferraro on my article "Southward shifting of the auroral zone,"** p. 292–294.

Gleissberg, W.: **A forecast of solar activity,** p. 294–295.

ournal of Geophysical Research, Volume 56, Number 3, September 1951.

Bowen, I. Gerald: **On the automatic chemical determination of atmospheric ozone,** p. 307–324.

Roach, F. E. and Pettit, Helen B.: **On the diurnal variation of [OI] 5577 in the nightglow,** p. 325–353.

Gibbons, J. J. and Nertney, R. J.: **A method for obtaining the wave solutions of ionospherically reflected long waves, including all variables and their height variation,** p. 355–371.

Mitra, A. P.: **The D-layer of the ionosphere,** p. 373–402.

Watts, J. M. and Brown, J. N.: **Effects of ionosphere disturbances on low frequency propagation,** p. 403–408.

Piddington, J. H.: **The modes of formation of the ionospheric layers,** p. 409–429.

Johnston, H. Freeborn: **List of geomagnetic observatories and thesaurus of values,** p. 431–438.

Nertney, R. J.: **Comments concerning the paper "Fine structure of the lower ionosphere" by R. A. Helliwell, A. J. Mallinckrodt, and F. W. Kruse, Jr.,** p. 449–451.

Grace, C. H.: **A note on certain characteristics of the normal E-layer,** p. 452–454.

urnal of Meteorological Research, Tokyo, Volume 3, Number 10, July 1951.

Kubota, K.: **Morning-cloudiness and rain at Nagoya,** p. 351–363.

Yoshida, S.: **Relation between rainfall and altitude on Mt. Iwate,** p. 364–367.

Kizawa, T.: **Geophysical phenomena in volcanic activity (3),** p. 368–377.

urnal of Meteorological Research, Tokyo, Volume 3, Number 11, September 1951.

Watanabe, T.: **Table of $V_\theta = \frac{\lambda}{2r}(a^2 - r^2)$ and its application,** p. 379–385.

Ooi, S.: **Synoptic researches of winter weather of Japan (1st Report) (Inland high and local fronts),** p. 386–400.

Nagao, T.: **Standard deviation of monthly mean pressure,** p. 401–416.

urnal of Meteorological Research, Tokyo, Volume 3, Number 12, September 1951.

Uwai, K.: **On the typhoons and tropical cyclone-groups in 1950 (I). (Generation and movement of tropical storms at the 700 mb surface),** p. 417–430.

Kawano, Y.: **Stream velocity in the ventilation cylinder of the C.M.O. II type aspiration psychrometer,** p. 431–433.

Nagao, T.: **Standard deviation of monthly mean temperature,** p. 434–448.

Leningrad, Glavnaia Geofizicheskaia Observatoriia, Trudy, Number 22(84), 1950.

Laĭkhtman, D. L.: **Predvychislenie sutochnykh kolebaniĭ temperatury v prizemnom slo atmosfery,** [Prediction of daily temperature variations in the air layers near the ground] p. 3–14.

Timofeev, M. P.: **O sutochnoĭ izmenschivosti turbulentnogo obmena,** [On the diurnal variatio of turbulent exchange], p. 15–25.

Tseĭtin, G. KH.: **O novom metode vychisleniia koefitsienta teploprovodnosti pochvy,** [On new method of calculation of the coefficient of heat conductivity in the soil], p. 26–33.

Voloshinova, G. A.: **Sravnenie razlichnykh metodov opredeleniia koefitsienta temperaturo provodnosti,** [The comparison of different methods of determination of the coefficient o temperature conductivity], p. 34–37.

Shekhter, F. N.: **K vychisleniiu luchistykh potokov tepla v atmosfere.** [On the calculation o radiant flux of heat in the atmosphere], p. 38–51.

Laĭkhtman, D. L.: **O vychislenii teplootdachi pochvy,** [On the calculation of the heat emissio of the soil], p. 52–54.

Borushko, I. S.: **O podobii profileĭ meteorologicheskikh elementov v prizemnom sloe vozdukh** [On the similarity of the profiles of meteorological elements in the air layer near the ground] p. 55–58.

Leningrad, Glavnaia Geofizicheskaia Observatoriia, Trudy, Number 23(85), 1951.

Gandin, L. S.: **Problema vetrovykh nagruzok na stroitel'nye sooruzheniia kak zadacha pr kladnoĭ meteorologii,** [Problems of wind stresses on structure as an aspect of applie meteorology], p. 3–14.

Gandin, L. S.: **O modelirovanii vetrovykh nagruzok na stroitel'nye sooruzheniia,** [On mode for studying wind damage to structures], p. 15–27.

Berliand, M. E.: **Effektivnost' otkrytogo obogreva rasteniĭ pri zamorozkakh,** [Effectiveness o outdoor warming of plants during frosts], p. 28–39.

Berliand, M. E.: **K teorii teplovogo rezhima prizemnogo sloia vozdukha,** [On the theory of th heat regime of the air layer near the ground], p. 40–48.

Gandin, L. S. and Soloveĭchik, R. E.: **O skheme Prandtlia v teorii turbulentnosti,** [On Prandtl scheme in turbulence theory], p. 49–65.

Berliand, M. E.: **K teorii izmeneniia vetra v prizemnom sloe atmosfery,** [On the theory of win variation in the layer of air near the ground], p. 66–75.

Leningrad, Glavnaia Geofizicheskaia Observatoriia, Trudy, Number 24(86), 1951.

Chestnaia, I. I.: **Izmenenie temperatury i vlazhnosti vozdukha pri perekhode iz kuchevog oblaka v okruzhaiushchuiu ego atmosferu,** [Air temperature and humidity variations durin the transition from a cumulus cloud into the surrounding atmosphere], p. 5–19.

Churinova, M. P.: **O turbulentnosti v nekotorye dni s kuchevymi oblakami,** [Turbulence o certain days with cumulus clouds], p. 20–26.

Shishkin, N. S.: **O sliianii oblachnykh kapel',** [Coalescence of cloud droplets], p. 27–38.

Shishkin, N. S.: **Osadki iz konvektivnykh oblakov,** [Precipitation from convective clouds] p. 39–47.

Kiriukhin, B. V.: **Uprugost' vodianogo para nad zhidkoĭ i zamerzsheĭ kapliami rastvora,** [Wate vapor pressure on liquid and frozen drops of a solution], p. 48–59.

Zamorskiĭ, A. D.: **Koaguliatsionnyĭ rost snezhinok,** [Growth of snow flakes by coalescence] p. 60–79.

Shvets, M. E.: **K voprosu ob izuchenii oblachnykh kapel' na tverdykh telakh,** [On the proble of investigation of cloud droplets on solid particles], p. 80–82.

Leningrad, Glavnaia Geofizicheskaia Observatoriia, Trudy, Number 25(87), 1951.

Lebedeva, K. D. and Smirnov, S. A.: **Pogreshnosti metoda izmereniia temperatury i vlazhnos vozdukha psikhrometricheskimi termometrami v budke,** [Inaccuracies of the method measuring the temperature and humidity of the air by psychrometers in a shelter], p. 5–1

Rusin, N. P.: **Izmerenie vertikal'nogo gradienta temperatury v prizemnom sloe vozdukha dl tseleĭ prikladnoĭ meteorologii i klimatologii,** [Measurement of the vertical gradient temperature of the air near the ground for applied meteorology and climatology], p. 20–2

Klestova, M. M.: **Pogreshnosti popravok aneroidov, primeniaemykh na seti meteorologicheskik stantsiĭ,** [Errors in aneroid corrections, used by meteorological stations], p. 27–36.

Kameneva, A. I.: **Pogreshnosti poverki aspiratsionnykh psikhrometrov,** [Errors in calibratio of aspiration psychrometers], p. 37–48.

Kameneva, A. I.: **O tochnosti poverki volosnykh gigrometrov,** [On the accuracy of calibration of hair hygrometers], p. 49–65.

Vorob'ev, I. E.: **K voprosu metodiki meteorologicheskikh nabliudenií na pustynnykh stantsiiakh,** [On methodology in meteorological observations at desert stations], p. 66–77.

Rusin, N. P.: **K voprosu metodiki obrabotki nabliudenii nad vlazhnost'iu vozdukha,** [On the methodology of computation of observations on the humidity of the air], p. 78–82.

Neehaev, I. N.: **O metodike nabliudenií temperatury poverkhnosti snega,** [On the method of observation of the temperature of snow cover], p. 84–87.

Nikitin, M. F.: **K metodike prosmotra nabliudenií nad temperaturoi pochvy na malykh glubinakh,** [On the method of checking observations of the soil temperature at small depths], p. 88–92.

Gaken, G. I.: **Ob izmenchivosti popravok gigrometrov,** [On the variability of hygrometer corrections], p. 93–96.

Meteorological Magazine, London, Volume 954, Number 80, December 1951.

James, R. W.: **A February cross-section along the Greenwich Meridian,** p. 341.

McCaffery, W. D. S.: **Unexpected fair weather over southern Scotland,** p. 346.

Hamilton, R. A.; Ronxin, J. T. and Parry, A. P.: **Halo phenomena at Prestwick,** p. 359.

Phillips, P. E.: **Clear-air turbulence,** p. 362.

Shellard, H. C. and Douglas, C. K. M.: **Low pressure recorded on February 4, 1951,** p. 362.

Miles, V. G.: **Radar and bright-band echoes in Southern Rhodesia,** p. 364.

Centenary of the Austrian Zentralanstalt für Meteorologie und Geodynamic, p. 366.

Cumulonimbus clouds over Lake Victoria, p. 367.

Meteorologické Zprávy, Volume 4, Number 5–6, 1950.

Petrovič, Štefan: **Štátne meteorologické a geofyzikálne observatórium v Hurbanove (Stará Ďala) päťdesiatročné,** [The National Meteorological and Geophysical station at Hurbanovo (Stará Dala) has been in action for fifty years], p. 101–103.

Konček, Mikuláš: **Vpád pevninského tropického vzduchu z oblasti Arábie a Malej Ázie do východnej polovíny strednej Európy v dňoch 20. až 22. apríla 1950,** [Invasion of continental tropical air from the region of Arabia and Asia Minor into the eastern half of Middle Europe in the days from April 20 to 22, 1950], p. 104–106.

Brandejs, Stanislav: **Tabulky pro výpočet indexu lomu vzduchu v oboru ultrakrátkých radiovln,** [Tables for calculating the air refraction index in the ultrashort radiowave range], p. 107–108.

Valníček, Boris: **Polarisace atmosférického světla,** [Polarization of atmospheric light], p. 108–110.

Brablec, Josef: **Klimatické vymezení oblastí v ČSR, vhodných pro pěstování rýže,** [Climatic definition of areas in Czechoslovakia suitable for growing rice], p. 110–113.

Zapletal, Ladislav: **Podnebí Československa,** [Climate of Czechoslovakia], p. 113–115.

Čermáková, Marie: **Srážky ve velké Praze,** [Precipitation in Prague and suburbs], p. 116–119.

Hanzlík, Stanislav: **O lidových povětrnostních pranostikách,** [On popular weather maxims], p. 120–122.

Komárek, Julius: **Předvídají zvířata zimu?** [Do animals foresee winter?] p. 120–122.

Trefná, Emilie: **Decimální třídění světových podnebí,** [Decimal classification of climates], p. 123–125.

Gr—, A.: **Ředitel čínské lidově demokratické meteorologické služby v Praze,** [The direction of the Chinese Popular Democratic Meteorological Service in Prague], p. 126.

Úmluva o světové meteorologické organisaci, [Agreement on meteorological world organization], p. 126–127.

Rudkovskij, Boris: **O významu uceleného fenologického pozorování ptactva v přírodě,** [The importance of a comprehensive phenological study of birds in their natural surroundings], p. 127–128.

Hromy a stromy, [Lightning strokes and trees], p. 128.

P——, Š.: **Rýchly vývoj oblačnosti na horách,** [Rapid formation of clouds on mountain tops], p. 128.

Růst ledových částic v kumulonimbech, [Growth of ice particles in cumulonimbus clouds], p. 129.

Vyvoj kumulonimbů, [Development of cumulonimbus], p. 129.

Fata morgana v našich krajích, [Fata morgana in our country], p. 129–131.

P——, Š.: **Dve pozorovateľské jubileá v slovenskej meteorologickej službe,** [Two observers' anniversaries in the Slovak meteorological service], p. 131.

Náš nový šedesátník, [Another sexagenarian], p. 131.

Votrubec, Ct.: **Za profesorem Dr V. J. Novákem,** [Obituary of professor Dr. V. J. Novak], p. 132.

Fikar, J.: **40 let dobrovolného pozorování na meteorologické stanici,** [40 years of spontaneous observation at a meteorological station], p. 132.

Kurc, J.: **Památce ředitele Josefa Švábenského,** [Obituary of director Joseph Švábenský], p. 132.

F. F.: **Vplyv počasia na pol'nohospodárstvo na Slovensku v máji 1950,** [Effect of the weather on agriculture in Slovaki in May 1950], p. P21.

Meteorologiia i Gidrologiia, Number 1, September 1950.

Zadachi zhurnala "Meteorolog'ia i Gidrologiia," [Aims of the journal "Meteorologiia i Gidrologiia"], p. 3–4.

Kashin, K. I. and Pogosian, KH. P.: **O vlagooborote v atmosfere,** [On moisture exchange in the atmosphere], p. 5–13.

Kalinin, G. P.: **Rol' lesa v raspredelenii osadkov,** [The rôle of forest in the distribution of precipitation], p. 14–20.

Buchinskiĭ, I. E.: **K voprosu vliianiia vysoty mestnosti na temperaturu i osadki,** [On the influence of the elevation of a region on temperature and precipitation], p. 21–25.

Zubian, Zh. D.: **K voprosu o prostranstvennoĭ strukture frontov okkliuzii,** [On the spatial structure of occlusions], p. 26–34.

Razumova, L. A.: **Izmenenie zapasov pochvennoĭ vlagi v zimniĭ period,** [The change in soil moisture storage during the winter season], p. 35–40.

Ivanov, I. V.: **K voprosu o vliianii zalesennostii basseĭna reki na vysotu vesennego polovod'ia,** [On the influence of forested river basins on the height of the spring flood], p. 41–47.

Bagrov, N. A.: **Analiz obrazovaniia poter',** [Analysis of the cause of water losses], p. 48–51.

Popov, E. G.: **O raschete poverkhnostnogo zaderzhaniia vody v rechnykh basseĭnakh dlia tseleĭ prognoza stoka,** [On the calculation of surface water retention in river basins for forecasting runoff], p. 52–60.

Belinskiĭ, N. A. and Istoshin, IU.V.: **Trebovaniia k postanovke gidrometeorologicheskikh nabliudeniĭ v more,** [Requirements for establishment of hydrometeorological observations at sea], p. 61–64.

Nikiforov, P. P.: **Nekotorye itogi obsluzhivaniia narodnogo khoziaĭstva otdelom morskikh prognozov TSentral'nogo instituta prognozov za poslednie gody,** [Some conclusions on the service to the national economy rendered by the department of marine forecasting of the Central Institute of Forecast during recent years], p. 65–69.

Selezneva, E. C.: **O tochnosti izmereniia vlazhnosti samoletnym meteorografom,** [On the accuracy of moisture measurement by airplane meteorographs], p. 70–72.

Karunin, N. A.: **O velichine oshibok pri opredelenii vysoty oblakov vizual'nym sposobom,** [On the magnitude of errors when determining height of the clouds by visual means], p. 72–75.

Skliarov, V. M.: **20-letie Moskovskogo gidrometeorologicheskogo tekhnikuma,** [20th anniversary of the Moscow Hydrometeorological Technical School], p. 76–77.

Lisachenko, F. P.: **O rabote tsentral'nykh kursov,** [On the work of the central training courses], p. 77–78.

Review

Samoĭlenko, V. S.: **A. A. Borisov. Klimatologiia,** [Climatology by A. A. Borisov], p. 79–81.

Meteorologiia i Gidrologiia, Number 2, October 1950.

Velikie stroĭki kommunizma i zadachi gidrometsluzhby, [The great development of communism and the aims of the Hydrometeorological Service], p. 3–9.

Kashin, K. I. and Pogosian, KH. P.: **K voprosu o klimate i klimatoobrazuiushchikh faktorakh,** [On climate and climate-forming factors], p. 10–15.

Tomfel'd, N. P.: **Gidrometeorologicheskoe obsluzhivanie narodnogo khoziaĭstva,** [Hydrometeorological Service in relation to the national economy], p. 16–19.

KHromov, S. P.: **K peresmotru osnovnykh poniatiĭ sinopticheskogo analiza,** [A review of the basic concepts of synoptic analysis], p. 20–26.

Zubian, G. D.: **Po povodu stat'i S. P. KHromova "K peresmotru osnovnykh poniatiĭ sinopticheskogo analiza,"** [A critique of the article by S. P. KHromov "A review of the basic concepts of synoptic analysis], p. 27–33.

Porofir'ev, I. F.; Stepanov, V. A. and Fedoseev, A. P.: **Opyt gydrometeorologicheskogo obsluzhivaniia pastbishchnogo zhivotnovodstva v Kazakhstane,** [Investigations by the hydrometeorological service on animal husbandry in Kazakhstan], p. 34–38.

Dmitrieva, N. G.: **Raschet plotnosti snezhnogo pokrova po meteorologicheskim dannym,** [Calculation of the density of the snow cover from meteorological data], p. 39–44.

Rzheplinskiĭ, G. B.: **O suloiakh u iugo-vostochnogo poberezh'ia Kryma,** [On confluence along the south-eastern coast of Crimea], p. 45–50.

Troian, I. K.: **Grafik-interpoliator skorosti i napravleniia vetra dlia standartnykh vysot,** [Graphic-interpolation of the speed and direction of wind for standard heights], p. 51–52.

Gol'dfarb, M. S.: **Grafik dlia vychisleniia vertikal'nogo gradienta temperatury,** [Graph for calculation of the vertical temperature gradient], p. 53.

Koshcheev, S. M.: **O registratsii zemliatriaseniĭ na metstantsiiakh,** [On the recording of earthquakes at meteorological stations], p. 53–54.

Dzhordzhio, Z. V.: **Vydelenie mezhennogo stoka na rekakh Sredneĭ Azii,** [Determination of limits for runoff for the rivers of Central Asia], p. 54–55.

Nezhikhovskiĭ, R. A.: **O kratkosrochnykh prognozakh urovneĭ na mnogopritochnom uchastke,** [On short range forecasting of the levels in multi-tributary regions], p. 55–56.

Liser, I. IA.: **O nabliudeniiakh nad temperaturoĭ vody rek,** [On the observations of the temperature of river water], p. 57.

Ofitserov, A. S.: **K voprosam rosta ledianogo pokrova i uskoreniia ledostava,** [On the problem of the growth of the ice cover and the intensification of the ice cover], p. 58–60.

Borsuk, O. N. and Skue, A. R.: **V. V. Aristovskiĭ "Gidrometricheskie sooruzheniia i konstruktsii,"** [Review of "Hydrometric equipment and construction" by V. V. Aristovskiĭ], p. 62–63.

Meteorologiia i Gidrologiia, Number 3, November 1950.

K XXXIII godovshchine Velikoĭ Oktiabr'skoĭ sotsialisticheskoĭ revoliutsii, [23rd anniversary of the Great October Socialist Revolution], p. 3–4.

Pogosian, KH. P. and Savchenkova, E. I.: **O chislovom vyrazhenii vida atmosfernoĭ tsirkuliatsii,** [On the quantitative representation of the atmospheric circulation], p. 5–13.

Kashin, K. I. and Gritsenko, M. V.: **Lesnye pozhary vo Frantsii,** [Forest fires in France], p. 14–19.

Kliucharev, S. S.: **O vycheslenii advektsii temperatury v tseliakh aerologicheskogo analiza,** [On the calculation of temperature advection for aerological analysis], p. 20–28.

Kats, A. L. and Semenov, V. G.: **O prodolzhitel'nosti estestvennykh sinopticheskikh periodov za 1938–1948 gg.,** [On the duration of natural synoptic periods from 1938–1948], p. 29–33.

Petunin, I. M.: **Nabliudeniia za sostoianiem zimuiushchikh posevov metodom otrashchivaniia,** [Observations on the condition of winter sowing by means of sampling (coring)], p. 34–36.

Kazantsev, B. P.: **Ispol'zovanie gidrologicheskogo podobiia rechnykh basseĭnov dlia prognozov pavodkov,** [Use of hydrological similarity of river basins for flood forecasting], p. 37–43.

Gurevich, M. I.: **O zavisimosti intensivnosti snegotaianiia ot temperatury vozdukha,** [On the dependence of the rapidity of snow melt on air temperature], p. 44–48.

Egorov, N. I.: **Raschet teplovogo balansa Krasnogo moria,** [Calculation of the heat balance of the Red Sea], p. 49–56.

Borsuk, V. N.: **K voprosu o metodike vetroenergeticheskikh raschetov,** [On the techniques of wind power calculations], p. 57–59.

Ostroumov, Z. S.: **Uproshchennyĭ sposob opredeleniia dat perekhoda srednesutochnykh temperatur cherez opredelennye znacheniia putem vychisleniia,** [Simplified method for determining the date of passage of midday temperature through certain values by statistical calculations], p. 59–60.

Samokhin, A. F.: **Novoe ob istoke r. Dona,** [The latest data on the source of the river Don], p. 60–62.

Afonskiĭ, A. V.: **Issledovaniia v volnovykh lotkakh,** [Investigations in (experimental) wave tanks], p. 62–64.

Review

Zaĭtzev, G. N. and Lednev, V. A.: **"Novaia" rabota prof. A. Defanta,** [The "new" work of Prof. A. Defant], p. 65–67.

Meteorologiia i Gidrologiia, Number 4, December 1950.

Budyko, M. I.: **Vydaiushchiĭsia russkiĭ meteorolog V. N. Karazin,** [The famous Russian meteorologist V. N. Karazin], p. 3–9.

Kulik, M. S.: **O predmete i zadachakh sel'skokhosiaĭstvennoĭ meteorologii,** [On the objectives and problems of agricultural meteorology], p. 10–13.

Lednev, V. A. and Rudovits, L. F.: **Ob okeanograficheskikh rabotakh SSSR za poslednie tridtsat' let,** [On oceanographic work of the U.S.S.R. during the past thirty years], p. 14–17.

Popov, E. G.: **O postanovke eksperimental'nykh issledovaniĭ na stokovykh stantsiiakh,** [On the organization of experimental investigations at river stations], p. 18–23.

Kats, A. L.: **Izmenenie napravlennosti perenosa vozdushnykh mass v troposfere pri smene estestvennykh sinopticheskikh periodov,** [On the changes in direction of movement of air masses in the troposphere during the transition between synoptic periods], p. 24–30.

Gogoleva, E. I. and Dobryshman, E. M.: **Sviaz' otnositel'noĭ vlazhnosti s raznost'iu mezhdu temperaturoĭ i tochkoĭ rosy,** [Relation between relative humidity and the difference between temperature and dew point], p. 31–34.

Bastamov, S. L.; Topol'nitskiĭ, N. M. and Fomain, N. P.: **O laboratoriiakh iskusstvennogo klimata,** [Artificial climatic laboratories], p. 35–38.

Kliucharev, S. S.: **Tekhnika vychisleniia advektivnykh izmeneniĭ temperatury po dannym sharopilotnykh nabliudeniĭ,** [Techniques in calculating the advective temperature change from pilot balloon data], p. 39–41.

Bartishvili, I. T.: **K voprosu o roli "zashchity" v opredelenii osadkov,** [On the role of "shielding" in precipitation measurements], p. 41–43.

Grinberg, Z. A.: **O morfometricheskikh kharakteristikakh rek,** [On the morphological characteristics of rivers], p. 43–46.

Neronov, IU. N.: **Vertikal'nye silovye vozdeĭstviia ledianogo polia na gidrotekhnicheskie sooruzheniia,** [The vertical force exerted by an ice field on hydrotechnical structures], p. 46–49.

Pervoe soveshchanie po geologii moria, [First conference on marine geology], p. 50–51.

Pokrovskaia, T.: **Obsuzhdenie knigi A. A. Borisova "Klimatologiia" v Glavnoĭ geofizicheskoĭ observatorii im. A. I. Voeĭkova,** [Critique of the book by A. A. Borisov: "Climatology" in the A. I. Voeĭkov Central Geophysical Observatory], p. 51–52.

Ivanov, I. V.: **Obsuzhdenie na Sovete TSentral'nogo instituta prognozov uchebnogo posobiia "Predskazanie morskikh gidrologicheskikh kharakteristik" (rukopis' K. I. Kudriavoĭ),** [Discussion in the Soviet Central Forecasting Institute of the textbook (students manual) "Forecasting marine hydrological characteristics"], p. 52.

Review

Popov, E. G.: **N. A. Belinskiĭ. Morskie gidrometeorologicheskie informatsii i prognozy,** [Review of marine hydrometeorological information and forecasting by N. A. Belinskiĭ], p. 53–54.

Monthly Weather Review, Volume 79, Number 8, August 1951.

MacDonald, T. H.: **Some characteristics of the eppley pyrheliometer,** p. 153–159.

Oliver, V. J.: **The weather and circulation of August 1951,** p. 160–162.

Carr, J. A.: **The rains over Arizona, August 26–29, 1951,** p. 163–167.

Monthly Weather Review, Volume 79, Number 9, September 1951.

Nelson, Elmer R.: **Red river of the North basin flood, April–June 1950,** p. 169–178.

Hawkins, Harry F., Jr.: **The weather and circulation of September 1951,** p. 179–182.

Carr, J. A.: **Movement of the storm of September 25–30, 1951,** p. 183–187.

Oceanographical Magazine, Tokyo, Volume 2, Number 2, June 1950.

Ichie, Takashi: **A note on the effect of inertia terms upon the drift currents,** p. (41)–(44).

Ichie, Takashi: **A note on wind-driven currents under a circular wind stress,** p. (45)–(48).

Ichie, Takashi: **A note on the friction terms in the equation of ocean currents,** p. (49)–(52).

Miyazaki, Masamori: **A theory of the transversal velocity distribution in ocean currents,** p. (53)–(57).

Nanniti, Tosio: **A lazy thermometer,** p. (59)–(65).

Hishida, Kozo: **Hydrography of the mouth of the Kumihama Bay,** p. (67)–(68).

Hanzawa, Masao and Takeda, Nobuo: **Preliminary report on the transformation of the Siberian Pc airmass traveling over sea in winter,** p. (69)–(75).

Hanzawa, Masao: **On the annual variation of evaporation from the sea-surface in the North Pacific Ocean,** p. (77)–(82).

Rivista di Meteorologia Aeronautica, Volume 11, Number 1, January–March 1951.

Charney, Jule G.: **I progressi della meteorologia dinamica,** [Progress in dynamic meteorology], p. 3–9.

De Pasquale, Oreste: **Ricerche sperimentali sulla turbolenza atmosferica,** [Experimental research on atmospheric turbulence], p. 10–28.

Visconti, Italo and Urbani, Marcello: **Sulla costruzione delle carte previste,** [On the construction of forecast charts], p. 29–31.
Bernacca, Edmondo: **Il tempo in Italia. Nel trimestre ottobre–dicembre 1950,** [The weather in Italy during the quarter Oct.–Dec. 1950], p. 32–34.

Tellus, Volume 3, Number 3, August 1951.

Mintz, Yale and Munk, Walter: **The effect of winds and tides on the length of the day,** p. 117–121.
Jerlov, N. G.: **Optical measurement of particle distribution in the sea,** p. 122–128.
Jenne, Werner: **Das Phänomen "Blaue Sonne,"** [The phenomenon "Blue Sun"], p. 129–134.
Ångström, Anders: **The blue sun of September 1950,** p. 135–140.
Reuter, Heinz: **Forecasting minimum temperatures,** p. 141–147.
Lönnqvist, Olov: **On the effective radiation to various parts of a cloudless sky,** p. 148–153.
Newton, C. W.; Phillips, N. A.; Carson, J. E. and Bradbury, D. L.: **Structure of shear lines near the tropopause in summer,** p. 154–171.
Berson, F. A.: **A synoptic-aerological study of interaction between vortices,** p. 172–190.
Brezowsky, H.; Flohn, H. and Hess, P.: **Some remarks on the climatology of blocking action,** p. 191–194.
Mintz, Yale: **The geostrophic poleward flux of angular momentum in the month of January 1949,** p. 195–200.
Sawyer, J. S. and Bushby, F. H.: **Note on the numerical integration of the equations of meteorological dynamics,** p. 201–204.
Kuo, H. L.: **A note on the kinetic energy balance of the zonal wind systems,** p. 205–207.
Arakawa, H.: **Possible heavy turbulent exchange between the extratropical tropospheric air and the polar stratospheric air,** p. 208–211.
Rossby, C.-G.: **Note on cooperative research projects,** p. 212–216.

Weather, Volume 6, Number 11, November 1951.

Watson, Edmond E.: **The Gulf Stream,** p. 323–327.
Roberts, I. C.: **Welsh Weather Lore,** p. 328–330.
Bonacina, L. C. W.: **London's picturesque Cloud Scenery!** p. 330–333.
Banerji, S. K.: **Determination of snow-melt in the Himalayas,** p. 334–338.
Meteorology at the British Association Meeting in Edinburgh, August 1951, p. 338–339.
Whiten, A. J.: **Mr. Wurzell's Weather Wisdom, No. 6,** p. 347.

Weather, Volume 6, Number 12, December 1951.

Wood, C. A.: **The two philosophies,** p. 355–359.
Dufour, L.: **Sketch history of meteorology in Belgium,** p. 359–364.
Gordon, A. H.: **Waterspouts,** p. 364–371.
International Union of Geodesy and Geophysics, 9th General Assembly, Brussels, 20 August to 1 September 1951, p. 373–375.
Leatherdale, F. R.: **The Babingley River,** p. 377–378.
Carapiperis, Leon N.: **On the periodicity of the Etesians in Athens,** p. 378–379.

Weatherwise, Volume 4, Number 5, October 1951.

Gray, George J., Jr.: **Jet streams and aircraft operations,** p. 99–101, 114.
Burgner, Newton M.: **The movement of hurricanes,** p. 102–105.
Early hurricanes of 1951, p. 105–106.
Means, Lynn L.: **The midwest windstorm of October 9–10, 1949,** p. 107–109.
Alexander, Verne: **The greatest flood of history,** p. 110–111.
Karapiperis, Photios P.: **The tower of the winds,** p. 112–113.
Snyder, C. Hugh: **A statistical study of drainage winds at Denver, Colorado,** p. 115–117.

Weatherwise, Volume 4, Number 6, December 1951.

Operation Moby Dick, p. 123.
Eichmeier, A. H.: **Snowfalls—Paul Bunyan Style,** p. 124–127.
Gray, George J., Jr.: **Ice fog and aircraft operations,** p. 128–130.
Winter strikes early in 1951, p. 131, 141–142.
American Meteorological Society, p. 132–133.
Mock, Conrad P.: **Philadelphia's greatest snowstorm—December 25–26, 1909,** p. 134–135.
Court, Arnold: **Coldest temperatures in the United States,** p. 136–139.

Wetter und Leben, Volume 3, Number 8, August 1951.

Hänsel, Hermann: **Über die Wirkung wechselnder Temperaturen auf Wachstum und Entwicklung einiger Pflanzen (Übersicht),** [On the effect of variable temperatures on the growth of certain plants (Summary)], p. 161–166.

Lauscher, Friedrich: **Dynamische Klimaskizze von Vorarlberg (Nordalpen),** [Sketch of dynamic climatology of Vorarlberg (Northern Alps)], p. 166–169.

Eckel, O.: **Ergebnisse von Strahlungsmessungen auf dem Sonnblick,** [Results of radiation measurements on the Sonnblick], p. 170–174.

Bruzek, A.: **Die Aktivität im laufenden Sonnenfleckenzyklus,** [The activity in the current sunspot cycle], p. 175–177.

Dirmhirn, Inge and Sauberer, Franz: **Die Bedeutung der diffusen Himmelsstrahlung im Bauwesen. I Teil: Freier Horizont,** [The importance of diffuse sky radiation in building design. Pt. I. Free horizon], p. 178–183.

Zeitschrift für Meteorologie, Volume 4, Number 11, November 1950.

Foitzik, Leonhard: **Zur meteorologischen Optik von Dunst und Nebel. Teil II,** [On the meteorological optics of haze and fog. Part II], p. 321–329.

Matzke, H. and Reinhard, H.: **Die Sonnenscheindauer in Greifswald,** [Sunshine duration in Greifswald], p. 330–336.

Heyer, E.: **Wirkungen des Golfstroms auf die Temperatur in Mitteleuropa in milden Wintern,** [Effects of the Gulf Stream on the temperature of central Europe in mild winters], p. 337–342.

Hollmann, Günther: **Zur numerischen Wettervorhersage,** [On numerical weather forecasting], p. 342–345.

Zeitschrift für Meteorologie, Volume 4, Number 12, December 1950.

Robitzsch, Max: **Die Eigentemperatur von Nebeltröpfchen,** [The temperature of fog droplets], p. 353–356.

Faust, Heinrich: **Änderungen der Relativen Topographie durch Vertikalbewegungen,** [Changes of the relative topography by vertical movements], p. 356–359.

Czepa, O.: **Über die nächtliche Abkühlung der Erdoberfläche und der bodennahen Luftschicht,** [On the nocturnal cooling of the earth's surface and of the layer of air near the ground], p. 359–362.

Hausmann, Gisela: **Unperiodische Schwankungen der Erdbodentemperaturen in 1 m bis 12 m Tiefe,** [Unperiodic oscillations of soil temperature in depths of 1 to 12 m.], p. 363–372.

Zeitschrift für Meteorologie, Volume 5, Number 9, September 1951.

Robitzsch, M.: **V. Bjerknes,** p. 257–258.

Hollmann, Günther: **Beitrag zu einer Theorie der Entstehung ortsfester Druckgebilde. (I),** [Contribution to a theory of the development of stationary pressure formations (I)], p. 258–267.

Maede, Hans: **Zur Frage der Abgrenzung des Wirkungsbereiches einer Wetterlage,** [On the question of the limit of the effective area of a weather situation], p. 268–273.

Flohn, H.: **Bemerkungen zu vorstehender Arbeit von H. Maede,** [Remarks on the preceding work], p. 273–274.

Schmauss, A.: **Randbemerkungen IX,** [Marginal notes IX], p. 274–277.

Schindelhauer, F.; Schrader, A. and Höringer, Cl.: **Berechnung der Höhe der unteren Schichten der Ionosphäre aus der Wellenform der Luftstörungen,** [Calculation of the height of the lower layers of the ionosphere from the wave form of atmospheric disturbances], p. 277–284.

Heyer, E.: **Immanuel Kant über den Einfluss des Mondes auf die Witterung,** [Immanuel Kant on the influence of the moon on the weather], p. 285.

von Rudloff, H.: **Bemerkungen zum "heissen Sommer 1950 in Graz,"** [Remarks on "The hot summer of 1950 in Graz"], p. 285–286.

PART IV. AUTHOR AND SUBJECT INDEX

In this section will be found reference to the numbers given at the head of each abstract or entry. In Part I each entry begins with the number 3.1–, and in the bibliography on Climatology of Northwest Africa (Part II) each entry begins with the number and letter 3A–. This index is divided into three parts:

Index of Authors Index of Subjects Index of Geographical Locations

INDEX OF AUTHORS

Abbot, Charles Greeley, 3.1–109
Accart, —, 3A–265
Algeria. Commissariat Général du Centenaire, 3A–118
Algeria. Service Météorologique, 3A–2, 3A–7, 3A–9 to 3A–11, 3A–21, 3A–182
Algiers. Université, Institut de Météorologie et de Physique du Globe, 3A–192, 3A–294, 3A–295
Algiers. Université, Institut de Recherches Sahariennes, 3A–251, 3A–296
Alvarez Castrillon y Bustelo, Manuel, 3.1–134
American Meteorological Society, Bulletin, 3.1–38
Amiable, J.-V., 3A–103
Anderson, Clinton P., 3.1–62
Angot, Alfred, 3A–4, 3A–31, 3A–32
Argence, E., 3.1–72
Arnberger, Erik, 3A–218
Asnani, G. C., 3.1–77
Aufrère, L., 3A–128
Ayra, Guiseppe, 3A–142

Backer, S. M. de *see* de Backer, S. M.
Bagnold, R. A., 3.1–123
Balkema, F., 3.1–122
Barasoian Oderiz, José Antonio, 3A–299
Ballert, C. G., 3A–243
Barbier, Daniel, 3.1–69
Barre, M., 3.1–73
Becker, F., 3.1–4
Beiser, Arthur, 3.1–111
Berkaloff, E., 3A–276
Bernard, Augustin, 3A–61
Berson, F. A., 3.1–78
Bidault, G., 3A–143, 3A–144, 3A–156, 3A–159, 3A–190, 3A–206, 4A–262, 3A–269, 3A–297
Biermann, W., 3A–8
Bintig, Paul, 3.1–121
Bloomfield, J. J., 3.1–164
Bochet, R., 3A–270
Boeuf, F., 3A–103
Bois, Charles, 3A–193, 3A–194, 3A–204, 3A–205, 3A–244, 3A–263, 3A–277, 3A–287
Bojdys, R., 3.1–127
Bonjean, G., 3A–245
Bourgeois, M., 3.1–152
Bovill, E. W., 3A–105
Boyden, M. W., 3A–232
Brablec, Josef, 3.1–115
Brandejs, Stanislav, 3.1–57
Bravo, F. Martín, 3.1–183
Bricard, J., 3.1–110
Brier, Glenn W., 3.1–118
Bringmann, K., 3.1–4
Brooks, Charles E. P., 3A–62, 3A–106, 3A–129
Brooks, Edward M., 3.1–141
Bruyère, P., 3A–195
Büttner, K., 3A–139
Buli, Ugo, 3.1–156
Bumba, V., 3.1–71
Bungard, Robert C., 3.1–52
Burchard, Oscar, 3A–36
Bush, Raymond, 3.1–116
Busse, W., 3.1–159
Bustelo, Manuel, 3.1–134

California Institute of Technology, 3.1–53
Canada. Meteorological Division, 3.1–26, 3.1–59
Capot-Rey, Robert, 3A–219, 3A–258
Carter, R. W., 3.1–143
Carvalho de Lacerda Castelo Branco, Hugo, 3A–196
Castet, J., 3A–226
Chalonge, Daniel, 3.1–69
Chapman, Sydney, 3.1–74, 3.1–105
Charl, P., 3A–278
Chelam, E. V., 3.1–126
Chernin, L. B., 3.1–161
Chicago. University, Dept. of Meteorology, 2A–232, 3A–246
Chile. Montezuma Observatory, 3.1–109
Choisy, Auguste, 3A–16
Combier, C., 3A–183
Conrad, Victor, 3A–72
Cornu, —, 3A–26
Coutagne, Aimé, 3A–279
Cramer, Harrison E., 3.1–125
Crestani, Giuseppe, 3A–122
Cross, William P., 3.1–144, 3.1–145
Cufino, L., 3A–42
Cuny, Marcel, 3A–267, 3A–239
Cyrenaica. Ufficio Meteorologico, 3A–123

Dartigues, P., 3.1–94
Dean, Gerdow, 3.1–103
de Backer, S. M., 3A–252
Debrach, Jean, 3A–144, 3A–145, 3A–157 to 3A–159, 3A–190, 3A–197, 3A–206, 3A–207, 3A–264, 3A–269, 3A–299, 3A–300
Dedebant, G., 3A–78, 3A–85, 3A–94
de Menezes, Carolos A., 3A–95
Desai, B. N., 3.1–95
Dessens, J., 3.1–63
Dessoliers, Hippolyte, 3A–113
d'Hauteserre, Boulet, 3A–237
Dieterichs, Heinz, 3.1–175
Diot, —, 3A–265
Dobbe, Maurice, 3A–168
Dresch, Jean, 3A–222
Dubief, Jean, 3A–160, 3A–161, 3A–169, 3A–208, 3A–220, 3A–227, 3A–233, 3A–234, 3A–247, 3A–288, 3A–295, 3A–297
Dubuc, E., 3A–114
Dunoyer, Mme M., 3A–213

Eady, E. T., 3.1–79
Eckardt, B., 3A–130
Edwardes, H. N., 3.1–39
El-Fandy, M. G., 3A–280
Emberger, Louis, 3A–146, 3A–147
Eredia, Filippo, 3A–37, 3A–43, 3A–44, 3A–49, 3A–51, 3A–53 to 3A–56, 3A–58, 3A–59, 3A–63 to 3A–66, 3A–68, 3A–69, 3A–73 to 3A–75, 3A–77, 3A–80, 3A–81, 3A–170 to 3A–172, 3A–184, 3A–185, 3A–198

Failletaz, R., 3A–186
Fàntoli, Amilcare, 3A–107, 3A–108, 3A–115, 3A–116, 3A–124, 3A–125, 3A–131 to 3A–134, 3A–140, 3A–148 to 3A–150, 3A–162, 3A–199, 3A–209, 3A–210
Ferraton, J.-L., 3A–190
Ferrini, Giovanni, 3A–1
Ficker, Heinrich von, *see* von Ficker, Heinrich
Fikar, Jan, 3.1–99
Fischer, Theobold, 3A–22
Flach, E., 3.1–131
Flammarion, Gabrielle Camille, 3A–151
Flohn, Hermann, 3.1–170
Florida State University, Dept. of Meteorology, 3.1–80
Font Tullot, Inocencio, 3.1–18, 3A–266, 3A–271, 3A–272, 3A–281, 3A–282
Foster, Walter D., 3.1–167
Fourey, Albert, 3A–267
Fowler, Earl C., 3A–232
Fowler, J. R., 3.1–42
Franc, J., 3A–76
France. Office National Météorologique, 3A–173, 3A–223, 3A–235
France. Service Hydrographique, 3A–248, 3A–273
Fraser, D. O., 3.1–16
Frolow, Vladimir, 3A–200

Gadre, K. M., 3.1–160
Gandin, L. S., 3.1–15
Gaubert, P., 3A–183
Gauckler, Philippe, 3A–27
Gaussen, Henri, 3A–283
Geiger, Rudolf, 3A–135
Gendre, F., 3A–249
General Mills Aeronautical Research Laboratories, 3.1–38
Gentil, Louis, 3A–70
George, M. C., 3A–243
Germany. Deutscher Wetterdienst in der US-Zone, 3.1–32
Ginestous, G., 3A–24, 3A–33, 3A–47, 3A–71, 3A–82, 3A–96, 3A–99
Gleeson, Thomas A., 3.1–80
Goldman, Louis, 3.1–173
Gorczyński, Władysław, 3A–83, 3A–103, 3A–109
Grandjean, A., 3A–213
Great Britain. Meteorological Office, 3A–236, 3A–284, 3A–289
Gribaudi, Dino, 3A–100
Grisollet, H., 3.1–113
Gseli, Stéphane, 3A–41
Guilmet, B., 3.1–86

Hachisuka, Masauji, 3A–129
Hall, Roy S., 3.1–100
Ham, C. J., van der, *see* van der Ham, C. J.
Hann, Julius, 3A–5, 3A–8, 3A–12, 3A–14, 3A–15, 3A–19, 3A–23, 3A–29, 3A–30, 3A–40
Harrison, Henry T., 3.1–17
Harrison, Louis P., 3.1–128
Hess, Victor F., 3.1–181
Hesselberg, Th., 3.1–155
Hlavac, Vaclav, 3.1–25
Hoeck, E., 3.1–135
Hollmann, Günther, 3.1–92
Hoover, Robert A., 3.1–60
Horning, Forrest E., 3.1–67
Houghton, Henry G., 3.1–125
Hulst, H. C. van de, *see* van de Hulst, H. C.

Instruments, Pittsburgh, 3.1–44
Ireland, A. W., 3.1–148
Isnard, Hildebert, 3A–290
Italy. Ministero delle Colonie, 3A–91
Italy. Ministero delle Colonie, Servizio Cartografico, 3A–117, 3A–181

Jaeger, Fritz, 3A–174
Jardim, Alberto Figueira (*trans.*), 3A–196
Javilliey, H., 3A–253
Jean Baptiste, Robert, 3A–301
John, I. G., 3.1–36
Johns Hopkins University, Laboratory of Climatology, 3.1–139
Joleaud, L., 3A–84
Jones, J. G., 3.1–74
Jones, M. W., 3.1–74
Jury, A., 3A–78, 3A–85

Kanter, H., 3A–152
Kastler, A., 3.1–110
Keil, Karl, 3.1–1
King, E., 3.1–106

Kleinschmidt, E., jun., 3.1–93
Klimenko, G. A., 3.1–168
Knoch, Karl, 3A–34
Köhn, M., 3.1–147
Kozlova, Z. M., 3.1–168
Kozumplik, Stanislav, 3.1–41
Kuipers, W. J. A., 3.1–88
Kumm, Alfred, 3.1–184

Lacroux, —, 3A–175
Landi, A., 3A–211
Langmuir, Irving, 3.1–136
La Paz. Universidad Mayor de San Andres, Misión Científica Alemana, 3.1–179
Lasserre, —, 3A–110, 3A–118
Lauriol, J., 3A–234, 3A–237
Lautensach, Hermann, 3A–293
Learmonth, A. T. A., 3.1–146
Legget, R. F., 3.1–149
Lemoing, C., 3A–86
Leningrad. Glavnaia Geofizicheskaia Observatoriia, 3.1–15
Leopold, Luna B., 3.1–64
Lespès, R., 3A–38
Link, F., 3.1–71
List, Robert J., 3.1–19
Longley, R. W., 3.1–114
Lossnitzer, H., 3.1–107
Lowell, S. C., 3.1–81
Lühe, P., 3A–130
Lunelund, Herald, 3.1–108
Lunson, E. A., 3A–291
Lynch, Alberto M., 3.1–8
Lyons, H. G., 3A–52

MacHattie, L. B., 3.1–102
McTaggart-Cowan, P. D., 3.1–9
Maire, René, 3A–146
Malaya. Meteorological Service, 3.1–33, 3.1–37
Malurcar, S. L., 3.1–95
Marcy, G., 3A–190
Martin, Ed., 3.1–157
Martinuzzi, Pietro, 3A–37
Maur, Heinrich von, *see* von Maur Heinrich
Mazzarelli, Gustavo, 3A–119
Mayot, M., 3.1–72
Meier, Frank, 3.1–91
Meinhold, Heinz, 3.1–178
Menezes, Carlos A. de *see* de Menezos, Carlos A.
Meteorological Magazine, London, 3.1–129
Meteorologische Zeitschrift, 3A–20
Mieghem, Jacques Van, *see* Van Mieghem, Jacques
Milan. Osservatorio de Fisica Terrestre, 3.1–34
Mintz, Yale, 3.1–56, 3.1–87
Minutilli, Federico, 3A–28
Mirrlees, S. T. A., 3A–106
Molnár, Ladislav, 3.1–142
Mondain, J., 3.1–132
Moore, D., 3.1–98
Muchnik, V. M., 2.1–133
Müller, Fritz, 3A–176
Namias, Jerome, 3.1–118, 3.1–119
Napoletano, Aldo, 3.1–171
Negro, Carlo, 3A–50
Neiburger, Morris, 3.1–130
Nicolet, Marcel, 3.1–70
Norquist, Kenneth, 3.1–145
Norton, Grady, 3.1–96

Ogilvie, Alan G., 3A–45
Oliva Flores, Eugenio, 3.1–43
Olufsen, Ole, 3A–92
Ostrekin, M. E., 3.1–29

Paech, H., 3.1–4
Palmer, C. E., 3.1–103
Parczewski, Władysław, 3.1–5
Parkash, Om, 3.1–112
Parrenin, H., 3.1–117
Paton, James, 3.1–177
Pawsey, J. L., 3.1–65
Pecker, Charlotte, 3.1–12, 3.1–14
Perret, Robert, 3A–153, 3A–163
Person, H., 3.1–147
Peruès, Maurice, 3A–161
Petitjean, Lucien, 3A–79, 3A–87, 3A–93, 3A–97, 3A–101, 3A–111, 3A–120, 3A–136, 3A–183, 3A–201, 3A–212, 3A–213, 3A–274
Peyturaux, Roger, 3.1–13
Piersig, Walter, 3A–164, 3A–177

Queney, Paul, 3A–160, 3A–169, 3A–238, 3A–239, 3A–254, 3A–255

Rabat, Morocco. Institut Scientifique Chérifien, 3A–90, 3A–98
Rabat, Morocco. Institut Scientifique Chérifien, Service de Physique du Globe et de Météorologie, 3A–137, 3A–214, 3A–221, 3A–297
Rao, Y. P., 3.1–126
Rassegna Economica delle Colonie, 3A–102
Raulin, Victor, 3A–3
Rawer, Karl, 3.1–72, 3.1–73
Reahder, Lucie, 3A–112
Regula, H., 3A–178
Reichelderfer, F. W., 3.1–66
Renaud, H.-P.-J., 3A–190
Reuter, F., 3A–215
Rex, Daniel F., 3.1–89
Richter, N., 3A–285
Rigotard, Marcel, 3A–165
Rivière, Ch., 3A–25, 3A–35, 3A–60
Robertson, George W., 3.1–68
Roche, G., 3A–94
Rodd, Francis R., 3A–106
Rodebush, W. H., 3.1–45
Rodewald, Martin, 3.1–97
Rogers, Peter, 3.1–35
Rohlfs, Gerhard, 3A–5
Rolland, Georges, 3A–16
Rouch, Jules Alfred Pierre, 3A–57, 3A–126, 3A–141
Rougerie, Paul, 3.1–172
Rougetet, E., 3.1–152
Roux, Georges, 3A–147, 3A–187, 3A–188, 3A–190, 3A–202, 3A–224, 3A–228, 3A–240, 3A–259, 3A–268, 3A–297

Rychliński, Jean Paul, 3A–88
Saito, H., 3.1–162
Sambuc, C., 3A–18
Samoilov, T. P., 3.1–169
Sanderson, Earl E., 3.1–150
Sanson, J., 3A–179
Sarna, H. R., 3.1–112
Sauberer, Franz, 3.1–47
Schell, I. I., 3.1–101
Schindler, P., 3A–166, 3A–189, 3A–190
Schirmer, Henri, 3A–13
Schmitt, Richard, 3.1–153
Schroeder, Gert, 3.1–179, 3A–229
Scott, James, C. W., 3.1–75
Seilkopf, Heinrich, 3.1–6
Seltzer, P., 3A–180, 3A–250, 3A–260
Semmelhack, W., 3A–154
Seper, H., 3.1–47
Sheppard, P. A., 3.1–124
Sherman, Leon, 3.1–103
Sidi Ifni. Ministerio del Aire, Servicio Meteorológico, 3A–298
Simmons, R. E. G., 3.1–174
Simon, A., 3.1–151
Sinclair, David, 3.1–46
Smith, Thomas, 3.1–176
Smithsonian Meteorological Tables, 3.1–19
Smithsonian Solar Observatory *see* Chile. Montezuma Observatory
Société des Sciences Naturelles du Maroc, 3A–167, 3A–190, 3A–269
Société Météorologique de France, 3A–39
Soloveĭchik, R. E., 3.1–15
South Africa. Meteorological Research Bureau, 3.1–54
Spain. Servicio Meteorológico Nacional, 3.1–18, 3.1–20 to 3.1–24, 3.1–137, 3A–155, 3A–256, 3A–261, 3A–275
Stary, Jaroslav, 3.1–140
Stebling, E. P., 3A–191
Stone, Edna S. (*trans.*), 3A–178
Strüder, Paul, 3.1–7
Süring, Reinhard, 3.1–2

Teisserenc de Bort, Léon, 3A–6
Tenerife. Centro Meteorológico, Boletín Mensual Climatológico, 3A–261
Teuchner, Zdeněk, 3.1–40
Thams, J. Chr., 3.1–135
Thevenet, A., 3A–17
Tothill, J. D. (*ed.*), 3.1–148
Trefná, E., 3.1–163
Tripolitania. Ufficio Meteorologico, 3A–127
Trouessart, E., 3A–67
Truesdell, C., 3.1–82
Tunis. Direction Générale de l'Agriculture du Commerce et de la Colonisation, 3A–203
Tunis. Service Botanique, 3A–103
Tunis. Service Météorologique, 3A–46, 3A–89, 3A–138, 3A–216, 3A–217, 3A–225
Tyner, R. V., 3.1–104

Uhlíř, Pavel, 3.1–117
Unger, Max, 3.1–165
U. S. Air Weather Service, 3.1–3, 3.1–27, 3.1–28, 3.1–48 to 3.1–51, 3.1–55, 3.1–58, 3.1–120, 3A–230
U. S. Hydrographic Office, 3A–241
U. S. National Bureau of Standards, 3.1–31
U. S. Office of Scientific Research and Development, National Defense Committee, 3.1–45, 3.1–46
U. S. Weather Bureau, 3.1–61, 3A–231, 3A–242, 3A–257

Vancour, Roger P., 3.1–181
van de Hulst, H. C., 3.1–30
Vandenplas, A., 3.1–83, 3.1–154
van der Ham, C. J., 3.1–88
Van Mieghem, Jacques, 3.1–83, 3.1–84, 3.1–90
Vidal Llenas, José M., 3.1–180
Viguier, Louis, 3A–286
von Ficker, Heinrich, 3A–121
von Maur, Heinrich, 3A–48
Vuorela, Lauri A., 3A–92

Wagner, Fritz, 3A–135
Wagner, Heinrich, 3.1–166
Webster, V. G. K., 3.1–98
Werner, J., 3.1–4
Westfold, K. C., 3.1–76
Wiegel, H., 3.1–138
Willett, Hurd C., 3.1–158
Wittschell, Leo, 3A–104
Wolf, Franz, 3.1–184

Zonzon, J., 3.1–86

INDEX OF SUBJECTS

Aachen, Meteorologisches Observatorium, 3.1–4
Actinometric data, 3A–173
Aeronautical climatology, 3A–57, 3A–82, 3A–86, 3A–111, 3A–230, 3A–241, 3A–242, 3A–275, 3A–278, 3A–284, 3A–289, 3A–291
Aeronautical meteorology, 3.1–16, 3.1–17, 3.1–127, 3.1–128
Aerosol filters, 3.1–45
Aerosol measurement, 3.1–46
Agricultural climatology, 3A–25, 3A–104, 3A–115, 3A–124, 3A–166, 3A–189, 3A–190, 3A–245, 3A–293
Agricultural meteorology, 3.1–168, 3.1–169
Agriculture, 3A–287
Air masses, 3.1–18, 3.1–36, 3.1–86, 3.1–95, 3A–79, 3A–136
Air trajectories, 3.1–140
Airplane weather reconnaissance, 3.1–28, 3.1–48
Airways forecasting, 3.1–103
Altimeter corrections, 3.1–120
Anemographs, 3.1–40, 3.1–41
Anemometers, 3.1–41
Annual reports, 3.1–32
Anticyclones, 3.1–92, 3.1–101
Apobs, 3.1–18
Aridity, 3A–113, 3A–174

Artificial fog, 3.1–67, 3.1–68
Artificial precipitation, 3.1–62, 3.1–63, 3.1–65, 3A–114
Artillery rawinsonde data, 3.1–51
Atlases, 3A–117
Atmospheric circulation, 3.1–78, 3.1–87, 3.1–90, 3A–52, 3A–176, 3A–177, 3A–185, 3A–201, 3A–208, 3A–215, 3A–254
Atmospheric disturbances, 3.1–79, 3.1–85, 3.1–90
Atmospheric electricity, 3.1–179
Atmospheric electricity instruments, 3.1–47
Atmospheric pollution, 3.1–67, 3.1–68, 3.1–138, 3.1–164, 3.1–173, 3A–154, 3A–198
Atmospheric pressure, 3.1–11, 3A–55, 3A–153, 3A–170, 3A–180, 3A–266
Atmospheric structure, 3.1–12
Atmospheric transparency, 3A–158
Atomic explosions, 3.1–182
Auroras, 3.1–177
Australia, Commonwealth Observatory, Sydney, 3.1–30
Automatic weather stations, 3.1–44
Aviation medicine, 3.1–179

Balloon research, 3.1–39
Barometer corrections, 3.1–24
Barometer reduction, 3.1–19
Barometry, 3.1–120
Bibliographies, 3.1–2, 3.1–53, 3A–28, 3A–132, 3A–187, 3A–190, 3A–260, 3A–296
Bioclimatology, 3.1–106, 3A–48, 3A–230, 3A–283
Biography, 3.1–1
Blocking action, 3.1–89
Boston Airport, Massachusetts, 3.1–173
Building construction, 3.1–106, 3.1–149

Canada, Meteorological Division, 3.1–9
Casablanca—Cairo air route, 3A–242
Castel Benito—Cairo air route, 3A–289
Climagrams, 3.1–25
Climatic changes, 3.1–66, 3.1–158, 3A–50, 3A–60, 3A–67, 3A–105, 3A–113, 3A–129, 3A–191, 3A–244, 3A–277, 3A–301
Climatic data, 3.1–32, 3.1–34, 3.1–137, 3.1–154, 3A–5, 3A–6, 3A–9, 3A–10, 3A–12, 3A–14, 3A–15, 3A–21, 3A–23, 3A–29, 3A–33, 3A–37, 3A–39, 3A–44, 3A–48, 3A–49, 3A–52, 3A–54, 3A–58, 3A–62 to 3A–65, 3A–68, 3A–71, 3A–74, 3A–90, 3A–92, 3A–98, 3A–102, 3A–106, 3A–110, 3A–123, 3A–126, 3A–127, 3A–129, 3A–138, 3A–141, 3A–167, 3A–235, 3A–250, 3A–256, 3A–261, 3A–294, 3A–295
Climatic regions, 3A–81, 3A–199, 3A–209
Climatic types, 3A–254
Climatic variations, 3.1–89, 3.1–156 to 3.1–157, 3A–287
Climatology, 3.1–108, 3.1–148 to 3.1–153, 3.1–155, 3A–1 to 3A–301
Cloud classification, 3.1–131
Cloud formation, 3.1–129
Cloud height, 3.1–132, 3.1–133, 3A–299
Cloud physics, 3.1–61, 3.1–178
Cloud seeding, 3.1–63 to 3.1–66, 3.1–136
Cloud variations, 3.1–131
Cloudiness, 3A–208
Clouds, 3.1–60
Code manuals, 3.1–27, 3.1–48, to 3.1–51, 3.1–55
Cold fronts, 3.1–60
Computation tables, 3.1–23
Condensation nuclei, 3.1–180, 3.1–182
Constant level balloons, 3.1–38
Constants, 3.1–19
Continentality, 3A–83, 3A–88
Convective currents, 3.1–125
Convergence, 3.1–77, 3.1–126
Cosmic ray intensity, 3.1–112
Cosmic ray origin, 3.1–111
Cotton, 3.1–167
Crop yields, 3.1–167
Cumulonimbus clouds, 3.1–129, 3.1–132
Cyclone structure, 3.1–93
Cyclones, 3A–236

D layer, 3.1–73
Definitions, 3.1–20, 3.1–70
Dendrochronology, 3.1–156
Denver Airport, Colorado, 3.1–67
Descartes, René, 3.1–7
Desiccation, 3A–191
Discontinuities, 3.1–81
Distant recording equipment, 3.1–41
Dropsondes, 3.1–28
Drought, 3A–162
Dust, 3A–198, 3A–226
Dust falls, 3A–154
Dust storms, 3A–152, 3A–280
Dynamic climatology, 3A–201, 3A–212
Dynamic meteorology, 3.1–79, 3.1–83
Dynamics of the atmosphere, 3.1–81, 3.1–92

Edmonton Airport, Alberta, 3.1–68
Electrical charges, 3.1–178
Electrical conductivity of air, 3.1–180
Electrical discharges, 3.1–184
Electromagnetic waves, 3.1–76
Electrometers, 3.1–47
Electron distribution, 3.1–72
Entrainment, 3.1–125
Evaporation, 3A–3, 3A–175, 3A–228, 3A–288
Evaporation data, 3A–286
Excessive rainfall, 3.1–139, 3.1–144 to 3.1–146, 3A–239
Expeditionary climatic data, 3A–5

F layer, 3.1–73
Flood frequencies, 3.1–143
Flood intensities, 3.1–143
Floods, 3.1–139, 3.1–144 to 3.1–146, 3A–219
Florida State University, Dept. of Meteorology, 3.1–10
Forage crops, 3.1–168
Forecast aids, 3.1–53
Forest influences, 3.1–159
Forests, 3A–283
Fragmentary climatic data, 3A–16, 3A–91
Freezing temperatures, 3.1–114
Frontal analysis, 3.1–102
Fronts, 3A–79, 3A–87, 3A–136

Frost, 3.1–104, 3A–144, 3A–159, 3A–190, 3A–213, 3A–259
Frost danger, 3.1–115
Frost forecasting, 3A–300
Frost prevention, 3.1–116
Frost protection, 3.1–117

General circulation, 3.1–85, 3.1–86, 3.1–158
General Mills Aeronautical Research Laboratories, 3.1–38
Geophysics, 3A–187, 3A–269
Glacial periods, 3.1–158
Glaciers, 3.1–157
Goose Airport, Labrador, 3.1–59
Graphical presentation, 3.1–25
Growing season, 3.1–115

Hail, 3A–7
Hail structure, 3.1–141
Hailstorms, 3.1–77, 3.1–141
Halo observations, 3.1–175
Halos, 3.1–176
Hamburg, Deutsche Seewarte, 3.1–6
Harmattan, 3A–154
Hay fever, 3.1–165
Health resorts, 3.1–163
Heating and ventilating, 3.1–161
Historical climates, 3A–41, 3A–50, 3A–100, 3A–125, 3A–244, 3A–277, 3A–301
History of meteorology, 3.1–1, 3.1–4 to 3.1–7
Horticulture, 3.1–116
Human activity, 3A–131
Humidity, 3.1–165
Hurricane tracks, 3.1–96
Hurricanes, 3.1–96, 3.1–97
Hydrologic cycle, 3.1–142
Hydrology, 3A–279
Hydrometeorology, 3.1–142
Hygrometry, 3.1–19

Icing of aircraft, 3.1–127, 3.1–128, 3.1–178
Indoor climates, 3.1–162
Insolation, 3.1–106, 3A–193
Instability, 3.1–78, 3.1–92
Instrument manuals, 3.1–43
Inversions, 3.1–18, 3.1–130
Ionization, 3.1–76, 3.1–180, 3.1–181
Ionosphere, 3.1–69, 3.1–72
Ionospheric data, 3.1–31
Ionospheric disturbances, 3.1–73
Ionospheric research laboratories, 3.1–171
Ionospheric stations, 3.1–29
Ionospheric structure, 3.1–75
Ionospheric tides, 3.1–74
Ionospheric variations, 3.1–171
Isentropic analysis, 3.1–93
Isotach analysis, 3.1–58

Jet stream, 3.1–124
Jets, 3.1–17

Katabatic winds, 3A–272
Khamsin, 3A–291

Land and sea breezes, 3.1–122
Light of the night sky, 3.1–110, 3A–285
Local forecasting, 3.1–59, 3.1–60
Long period records, 3.1–113, 3.1–134, 3.1–137, 3.1–155, 3A–96, 3A–148, 3A–204
Long range forecasting, 3A–97, 3A–257, 3A–274
Lunar diurnal ionospheric tides, 3.1–74
Lunar diurnal variations, 3.1–172
Lunar influences, 3.1–74

Magnetic declinations, 3.1–172
Magnetic storms, 3.1–112
Manuals, 3.1–3, 3.1–23, 3.1–58
Marine disasters, 3.1–91
Marine meteorology, 3.1–6, 3A–248, 3A–273
Marrakech–Tripoli air route, 3A–242
Mars, 3.1–11
Marseilles–Castel Benito air route, 3A–284
Mechanics of the atmosphere, 3.1–82, 3.1–84
Medical climatology, 3.1–163 to 3.1–166, 3A–184, 3A–265
Meridional index, 3.1–124
Meteor trails, 3.1–71
Meteorological conferences, 3.1–15
Meteorological elements, 3.1–17, 3.1–167
Meteorological observatories, 3.1–4, 3A–195
Meteorological services, 3.1–8, 3.1–9, 3.1–20, 3.1–32, 3A–118
Meteorological specialists, 3.1–3
Meteorological stations, 3A–190
Meteorology, 3.1–2
Microclimatology, 3.1–159 to 3.1–161
Microwave research, 3.1–30
Morphology, 3A–128
Mountain meteorology, 3A–206
Mud rains, 3A–183

Noctilucent clouds, 3.1–177
Nocturnal cooling, 3A–25, 3A–207
Nocturnal radiation, 3.1–110
Nomograms, 3.1–57

Objective forecasting, 3.1–53
Observational data, 3.1–33, 3.1–148, 3A–11, 3A–46, 3A–137, 3A–173, 3A–181, 3A–192, 3A–214, 3A–216, 3A–217, 3A–221, 3A–225, 3A–297, 3A–298
Observatories, 3A–151
Observers manuals, 3.1–20 to 3.1–22, 3.1–24, 3.1–28, 3.1–120
Oceanography, 3A–126
Optical phenomena, 3A–119
Optimum flight paths, 3.1–16
Orchard heating, 3.1–117
Orographic influences, 3A–282

Paleoclimatology, 3A–222
Paris–Dakar air route, 3A–86
Periodicities, 3.1–109, 3A–97, 3A–244, 3A–277
Personnel classification, 3.1–3
Peru, Servicio Meteorológico, 3.1–8
Phenology, 3.1–169
Pilot guides, 3A–241, 3A–248, 3A–273
Planetary atmospheres, 3.1–11, 2.1–12
Plant ecology, 3A–146
Polar outbreaks, 3.1–104

Precipitation, 3.1–126, 3A–3, 3A–10, 3A–18, 3A–24, 3A–26, 3A–27, 3A–31, 3A–32, 3A–34, 3A–35, 3A–56, 3A–66, 3A–78, 3A–84, 3A–88, 3A–96, 3A–98, 3A–116, 3A–134, 3A–140, 3A–147 to 3A–149, 3A–162, 3A–190, 3A–204, 2A–208 to 3A–210, 3A–258, 3A–268, 3A–271, 3A–279, 3A–283, 3A–290, 3A–299
Precipitation data, 3.1–137, 3A–47, 3A–61, 3A–89, 3A–94, 3A–203, 3A–216, 3A–219, 3A–221, 3A–240, 3A–245, 3A–247, 3A–253
Precipitation distribution, 3.1–138, 3A–200
Precipitation measurement, 3.1–135
Pressure changes, 3A–178
Pressure distribution, 3A–52
Pressure pattern flying, 3.1–16
Pressure variations, 3A–177
Pressure-temperature correlations, 3.1–118, 3.1–119
Progress in meteorology, 3.1–124
Psychrometers, 3.1–42
Psychrometric studies, 3A–237
Punched card analysis, 3.1–167

Radiation, 3A–139
Radiation balance, 3.1–117, 3A–280
Radiation climate, 3.1–107
Radiation instruments, 3.1–108, 3A–103
Radio observatories, 3.1–30
Radio waves, 3.1–72
Radioactivity in the atmosphere, 3.1–181, 3.1–182
Radiosonde codes, 3.1–27
Radiosonde data, 3.1–118
Radiosondes, 3.1–43
Rain gage exposure, 3.1–135
Rain intensities, 3A–165
Rainbows, 3.1–174
Rainfall, 3A–220
Rainfall extremes, 3A–194, 3A–205
Rainfall forecasting, 3.1–61
Rainfall frequencies, 3A–276
Rainfall observation, 3.1–22, 3.1–134
Rainfall probability, 3.1–136
Rainstorms, 3.1–35
Rainwater analysis, 3.1–140
Recording equipment, 3.1–47
Reduction tables, 3.1–23, 3.1–24
Relative topography, 3.1–57
Rheumatism, 3.1–166
Rime formation, 3.1–184

Sand dunes, 3.1–123, 3A–128, 3A–255
Sandstorms, 3A–183, 3A–198, 3A–227, 3A–233, 3A–252, 3A–270, 3A–291
Sea temperatures, 3.1–121, 3A–202
Seasonal temperature variations, 3.1–113
Sferics, 3A–270
Sferics codes, 3.1–49
Short range forecasting, 3.1–53
Sinusitis, 3.1–165
Sirocco, 3A–213, 3A–236
Smoke, 3.1–173
Snow, 3A–51, 3A–159, 3A–190
Snow cover, 3.1–168
Soil moisture instruments, 3.1–147
Soil moisture measurement, 3.1–147
Solar activity, 3.1–158
Solar atmosphere, 3.1–76
Solar influences, 3.1–171
Solar phenomena, 3.1–170
Solar radiation, 3.1–80, 3.1–105, 3.1–108, 3.1–109, 3.1–111, 3A–103, 3A–109, 3A–145, 3A–157, 3A–158, 3A–186, 3A–190, 3A–197, 3A–226, 3A–264
Solar temperature, 3.1–13
Spain, Servicio Meteorológico Nacional, 3.1–20
Squalls, 3A–178
Statistical analysis, 3.1–167
Statistical forecasting, 3.1–52, 3.1–54
Statistical studies, 3.1–118, 3.1–119
Stellar atmospheres, 3.1–14
Storm tides, 3A–190
Storms, 3.1–91
Stratocumulus decks, 3A–299
Stratosphere, 3.1–69
Stratus clouds, 3.1–130, 3A–278
Stratus forecasting, 3A–299
Sublimation nuclei, 3.1–136
Süring, Reinhard, 3.1–1
Sugarcane, 3.1–160
Sunshine data, 3A–286
Sunspot cycles, 3.1–170
Sunspots, 3.1–101, 3A–140
Supersaturation, 3.1–128
Symmetry points, 3A–97
Synoptic aerological studies, 3.1–103, 3A–211
Synoptic analysis, 3.1–55, 3.1–58, 3.1–96, 3A–93, 3A–159
Synoptic charts, 3A–137, 3A–192
Synoptic codes, 3.1–20, 3.1–49, to 3.1–51
Synoptic meteorology, 3A–289
Synoptic reports, 3.1–27
Synoptic studies, 3A–87, 3A–120, 3A–177, 3A–232, 3A–246, 3A–289, 3A–292

Tables, 3.1–19
Tamanrasset, Algeria, Observatoire Jules Carde, 3A–151, 3A–195,
Teaching of meteorology, 3.1–10
Teaching of oceanography, 3.1–10
Temperature, 3A–56, 3A–75, 3A–98, 3A–133, 3A–190, 3A–218, 3A–301
Temperature data, 3A–43, 3A–47, 3A–188
Temperature extremes, 3.1–114
Temperature observation, 3.1–21
Temperature variations, 3.1–159, 3A–224
Tenerife, Izaña Observatory, 3A–299
Tephigrams, 3.1–26
Terminal forecasts, 3.1–50
Terrestrial magnetism, 3.1–75, 3.1–105
Textbooks, 3.1–69
Thunderstorm distribution, 3A–164
Thunderstorm electricity, 3.1–183
Topographic effects, 3.1–80
Tornado damage, 3.1–99
Tornadoes, 3.1–99, 3.1–100
Trade inversion, 3.1–61
Translations, 3.1–153

Transmission coefficients, 3A–285
Tropical cyclones, 3.1–56, 3.1–94, 3.1–98
Tropical fronts, 3.1–103, 3A–211
Tropical meteorology, 3.1–86, 3.1–95
Tropopause, 3.1–81
Tuberculosis, 3A–184
Turbidity, 3A–186, 3A–190, 3A–207, 3A–226
Turbulent exchange, 3A–280

U. S. Weather Bureau, 3.1–66
Upper air analysis, 3.1–57
Upper air data, 3.1–36, 3A–130, 3A–138, 3A–155, 3A–173
Upper air flights, 3.1–17
Upper air observation, 3A–169
Upper air wind charts, 3.1–58
Upper air wind data, 3.1–37
Upper air winds, 3.1–124, 3A–82, 3A–111, 3A–130, 3A–135, 3A–168, 3A–170 to 3A–172, 3A–176, 3A–282
Upper atmosphere, 3.1–70
Upper atmosphere research, 3.1–71
Urban climates, 3A–249
Urban influences, 3.1–180

Valley winds, 3.1–80
Vegetation, 3A–84
Vertical motion, 3.1–125
Vertical velocity, 3.1–126
Visibility, 3.1–173, 3A–179, 3A–231
Visual acuity, 3.1–133
Vortexes, 3.1–84
Vorticity, 3.1–100
Vorticity theory, 3.1–82

Warm fronts, 3.1–102
Water resources, 3.1–150
Water vapor, 3A–99
Waterspouts, 3A–156, 3A–190
Weather, 3A–152
Weather comparisons, 3.1–152
Weather control, 3.1–62, 3.1–66, 3A–113
Weather forecasting, 3.1–52, 3.1–56, 3A–93, 3A–120, 3A–136, 3A–270
Weather types, 3.1–88, 3A–85
Whirlwinds, 3A–263
Wind data, 3A–171
Wind effects, 3.1–121, 3.1–123, 3A–255
Wind instruments, 3.1–40
Wind roses, 3A–282
Winds, 3A–128, 3A–143, 3A–185, 3A–190, 3A–267
Wintering of crops, 3.1–168

Yearbooks, 3.1–34

INDEX OF GEOGRAPHICAL LOCATIONS

Aachen, Germany, 3.1–4
Adélie Land, Antarctic, 3.1–73
Africa, 3A–185, 3A–198
Agadir, Morocco, 3A–278
Ajurdjura, Algeria, 3A–38
Algeria, 3.1–35, 3A–2 to 3A–4, 3A–7, 3A–9 to 3A–12, 3A–17 to 3A–19, 3A–21, 3A–23, 3A–25 to 3A–27, 3A–31, 3A–35, 3A–38, 3A–39, 3A–76, 3A–92, 3A–110, 3A–111, 3A–113, 3A–118, 3A–120, 3A–133, 3A–141, 3A–151, 3A–160, 3A–161, 3A–165, 3A–169, 3A–173, 3A–174, 3A–180, 3A–182, 3A–183, 3A–186, 3A–192, 3A–195, 3A–208, 3A–212, 3A–213, 3A–219, 3A–220, 3A–223, 3A–226, 3A–227, 3A–231, 3A–233 to 3A–235, 3A–237 to 3A–239, 3A–241, 3A–250, 3A–251, 3A–253, 3A–254, 3A–260, 3A–267, 3A–270, 3A–273, 3A–274, 3A–279, 3A–288, 3A–290, 3A–294, 3A–295, 3A–296
Algiers, Algeria, 3A–2, 3A–3, 3A–18, 3A–21, 3A–25, 3A–27, 3A–35, 3A–111, 3A–180, 3A–253
Arabia, 3A–126
Aragon, Spain, 3.1–153
Atlantic Ocean, 3A–203, 3A–292
Atlas Mountains, 3A–34, 3A–87, 3A–236, 3A–267
Australia, 3.1–30, 3A–88
Ayata, Algeria, 3A–23, 3A–26, 3A–39
Azizia, Tripolitania, 3A–73
Azores, 3A–6, 3A–241, 3A–248
Azrou, Morocco, 3A–262
Balearic Islands, 3.1–18, 3A–275
Barcelona, Spain, 3.1–134, 3.1–180
Belgium, 3.1–154
Bengasi, Libya, 3A–32, 3A–42, 3A–44, 3A–77, 3A–134, 3A–171
Bikini, Marshall Islands, 3.1–103, 3.1–182
Black Forest, Germany, 3.1–107, 3.1–159
Bolivia, 3.1–179
Boston, Massachusetts, 3.1–173
British Columbia, 3.1–104

Cabo Yubi, Spanish Sahara, 3A–281
California, 3.1–130
Canada, 3.1–9, 3.1–114, 3.1–149
Canary Islands, 3A–6, 3A–8, 3A–36, 3A–121, 3A–155, 3A–176, 3A–215, 3A–230, 3A–241, 3A–248, 3A–261, 3A–266, 3A–275, 3A–282, 3A–299
Cape Spartel, Morocco, 3A–62
Cape Verde Islands, 3A–230, 3A–248
Caribbean Sea, 3.1–86
Casablanca, Morocco, 3A–48, 3A–157, 3A–158, 3A–229
Centa, Spanish Morocco, 3A–256
Colorado, 3.1–67
Como, Italy, 3.1–34
Constantine, Algeria, 3A–3, 3A–21
Corsica, 3A–235, 3A–273
Cufra Oazis, Libya, 3A–5
Cussabat, Tripolitania, 3A–64

Cyrenaica, 3A–58, 3A–68, 3A–102, 3A–107, 3A–117, 3A–123, 3A–125, 3A–132, 3A–181
Czechoslovakia, 3.1–99, 3.1–115, 3.1–140, 3.1–142

Egypt, 3.1–151, 3A–6, 3A–133, 3A–280, 3A–289, 3A–291
Elkins, West Virginia, 3.1–60
Eritrea, 3A–122
Er-Regima, Cyrenaica, 3A–68
Europe, 3.1–89, 3.1–170, 3A–88, 3A–264

Fezzan, Libya, 3A–115
Finland, 3.1–108
France, 3.1–63, 3.1–113, 3.1–152, 3.1–172, 3.1–182, 3A–273
French Coast, 3A–57
French Equatorial Africa, 3A–252
French West Africa, 3A–223

Gabes, Tunisia, 3A–14
Garian, Tripolitania, 3A–65
Gebel, Tripolitania, 3A–53
Georgia, United States, 3.1–143
Germany, 3.1–4, 3.1–6, 3.1–32, 3.1–107, 3.1–138, 3.1–159, 3.1–170
Ghadames, Tripolitania, 3A–49
Gibraltar, 3A–230
Grand Atlas Mountains, 3A–222
Gulf of Tunis, 3A–82

Hawaiian Islands, 3.1–61, 3.1–64
Hoggar, Algeria, 3A–151, 3A–169, 3A–186, 3A–208

India, 3.1–95, 3.1–112
Ismailia, Egypt, 3A–6
Italian East Africa, 3A–132, 3A–181, 3A–185
Italian Aegean Islands, 3A–132
Italy, 3.1–34, 3.1–156, 3.1–171, 3A–80
Izaña, Canary Islands, 3A–155, 3A–266

La Paz, Bolivia, 3.1–179
Libya, 3A–5, 3A–6, 3A–20, 3A–28, 3A–32, 3A–37, 3A–42 to 3A–44, 3A–50, 3A–55, 3A–66, 3A–77, 3A–91, 3A–100, 3A–115, 3A–116, 3A–122, 3A–124, 3A–131, 3A–133, 3A–134, 3A–139, 3A–140, 3A–142, 3A–148, 3A–149, 3A–162, 3A–170 to 3A–172, 3A–185, 3A–199, 3A–209, 3A–210, 3A–285, 3A–289, 3A–291

Madagascar, 3.1–132
Madeira, 3A–95, 3A–196, 3A–230, 3A–241, 3A–248, 3A–293
Madrid, Spain, 3.1–180
Majorca, Balearic Islands, 3.1–18
Malaya, 3.1–33, 3.1–37
Marrakech, Morocco, 3A–29, 3A–265
Mediterranean, 3A–211, 3A–246, 3A–273
Melilla, Spanish Morocco, 3A–256
Missouri, 3.1–141
Misurata, Tripolitania, 3A–69
Mitidja, Algeria, 3A–76
Mogador, Morocco, 3A–40, 3A–48
Morocco, 3A–6, 3A–15, 3A–22, 3A–29, 3A–30, 3A–40, 3A–45, 3A–48, 3A–61, 3A–62, 3A–70, 3A–77, 3A–84 to 3A–86, 3A–90, 3A–94, 3A–98, 3A–137, 3A–141, 3A–143 to 3A–147, 3A–157 to 3A–159, 3A–166 to 3A–168, 3A–173, 3A–182, 3A–187 to 3A–190, 3A–197, 3A–200, 3A–202, 3A–206, 3A–207, 3A–214, 3A–221, 3A–222, 3A–224, 3A–228, 3A–229, 3A–235, 3A–240, 3A–241, 3A–245, 3A–249, 3A–259, 3A–262, 3A–264, 3A–265, 3A–268, 3A–269, 3A–273, 3A–277, 3A–278, 3A–297, 3A–299, 3A–300
Moroccan Coast, 3A–126, 3A–156
Mozambique Channel, 3.1–97

Naples, Italy, 3.1–171
Near East, 3A–198
Netherlands, 3.1–88, 3.1–122
New Caledonia, 3.1–94
New Jersey, 3.1–139
New Mexico, 3.1–136
North Africa, 3A–41, 3A–52, 3A–60, 3A–67, 3A–93, 3A–112, 3A–114, 3A–179, 3A–201, 3A–242, 3A–243, 3A–258, 3A–264, 3A–280, 3A–301
North America, 3.1–101, 3.1–119
North Atlantic Ocean, 3.1–86, 3.1–96, 3.1–98, 3.1–174
North Borneo, 3.1–33
Northeast Atlantic Ocean, 3A–177, 3A–215, 3A–246
Northwest Africa, 3A–34, 3A–87, 3A–120, 3A–136, 3A–211, 3A–232, 3A–246
Northwest African Coast, 3A–130, 3A–135, 3A–154, 3A–164, 3A–177, 3A–178
Norway, 3.1–155

Ohio, 2.1–144, 2.1–145, 2.1–150
Old Castile, 3.1–153
Ontario, 3.1–102
Oran, Algeria, 3A–3, 3A–21, 3A–31, 3A–270
Orfella, Tripolitania, 3A–63

Paris, France, 3.1–113
Peru, 3.1–8
Poland, 3.1–5
Porto Santo, Madeira Islands, 3A–95
Portugal, 3.1–137
Prague, Czechoslovakia, 3.1–141
Primor'e, Siberia, 3.1–168, 3.1–169
Puy-de-Dôme, France, 3.1–63

Rabat, Morocco, 3A–6, 3A–168
Ross Asfour, Atlas Mountains, 3A–267
Ravenna, Italy, 3.1–156
Rhine Region, Germany, 3.1–138
Rockcliffe, Ontario, 3.1–102
Sahara Desert, 3A–12, 3A–13, 3A–16, 3A–79, 3A–83, 3A–92, 3A–101, 3A–105, 3A–106, 3A–109, 3A–110, 3A–112, 3A–113, 3A–118, 3A–120, 3A–128, 3A–129, 3A–133, 3A–139, 3A–153, 3A–160, 3A–161, 3A–163, 3A–169, 3A–183, 3A–186, 3A–191, 3A–195, 3A–198, 3A–208, 3A–219, 3A–220, 3A–223, 3A–227, 3A–233, 3A–234, 3A–236 to 3A–238, 3A–247, 3A–

252, 3A–254, 3A–255, 3A–258, 3A–285, 3A–288, 3A–294 to 3A–296
St. Louis, Missouri, 3.1–141
Santa Cruz de Tenerife, Canary Islands, 3A–155
Scotland, 3.1–146, 3.1–177
Seville, Spain, 3.1–183
Siberia, U.S.S.R., 3.1–168, 3.1–169
Sidi-Ifni, Spanish Sahara, 3A–272, 3A–281, 3A–298
Sidi-Yahia, Algeria, 3A–39
Sierra Leone, Africa, 3A–230
Singapore, Malaya, 3.1–36
Smara, Spanish Sahara, 3A–281
Somaliland, 3A–122
South Africa, 3.1–54
South America, 3A–88, 3A–292
South Pacific Ocean, 3.1–98
Southern Arabia, 3.1–123
Soviet Arctic, 3.1–29
Spain, 3.1–20, 3.1–134, 2.1–137, 3.1–153, 3.1–180, 3.1–183, 3A–155, 3A–275
Spanish Morocco, 3A–256, 3A–275
Spanish Sahara, 3A–271, 3A–272, 3A–281, 3A–298
Sudan, 3.1–148
Suez, Egypt, 3A–6
Sweden, 3.1–175
Sydney, Australia, 3.1–30
Syria, 3A–183

Tamanrasset, Algeria, 3A–161, 3A–226, 3A–237
Tangier, Morocco, 3A–30, 3A–256
Tarhuna, Tripolitania, 3A–74
Tenerife, Canary Islands, 3A–121, 3A–176, 3A–266, 3A–282, 3A–299
Tetuán, Spanish Morocco, 3A–256
Texas, 3.1–100
Toulon, France, 3.1–152
Tripoli, Libya, 3A–6, 3A–20, 3A–32, 3A–37, 3A–42 to 3A–44, 3A–55, 3A–66, 3A–134, 3A–142, 3A–148, 3A–172
Tripolitania, 3A–49, 3A–51, 3A–53, 3A–54, 3A–56, 3A–59, 3A–63 to 3A–65, 3A–69, 3A–72 to 3A–75, 3A–80, 3A–81, 3A–102, 3A–104, 3A–108, 3A–117, 3A–119, 3A–125, 3A–127, 3A–132, 3A–139, 3A–150, 3A–152, 3A–181, 3A–184, 3A–218, 3A–241, 3A–284, 3A–285, 3A–289
Tropical Pacific, 3.1–103
Tunis, Tunisia, 3A–1, 3A–204, 3A–217, 3A–257, 3A–286
Tunisia, 3A–1, 3A–14, 3A–24, 3A–31, 3A–33, 3A–46, 3A–47, 3A–71, 3A–82, 3A–83, 3A–88, 3A–89, 3A–99, 3A–103, 3A–138, 3A–141, 3A–173, 3A–175, 3A–182, 3A–183, 3A–193, 3A–194, 3A–203 to 3A–205, 3A–216, 3A–217, 3A–225, 3A–231, 3A–235, 3A–241, 3A–244, 3A–257, 3A–263, 3A–273, 3A–276, 3A–283, 3A–286, 3A–287

U.S.S.R., 3.1–15, 3.1–168, 3.1–169
United States, 3.1–91

Val-Joyeux, France, 3.1–172
Villa Cisneros, Spanish Sahara, 3A–281

Washington, D. C., 3.1–31
West Africa, 3A–230, 3A–292
West African Coast, 3A–248
West Virginia, 3.1–60
Western Europe, 3.1–140
Western Mediterranean, 3A–57

Zanzur Oasis, Tripolitania, 3A–56
Zauia, Tripolitania, 3A–59
Zuara, Tripolitania, 3A–54